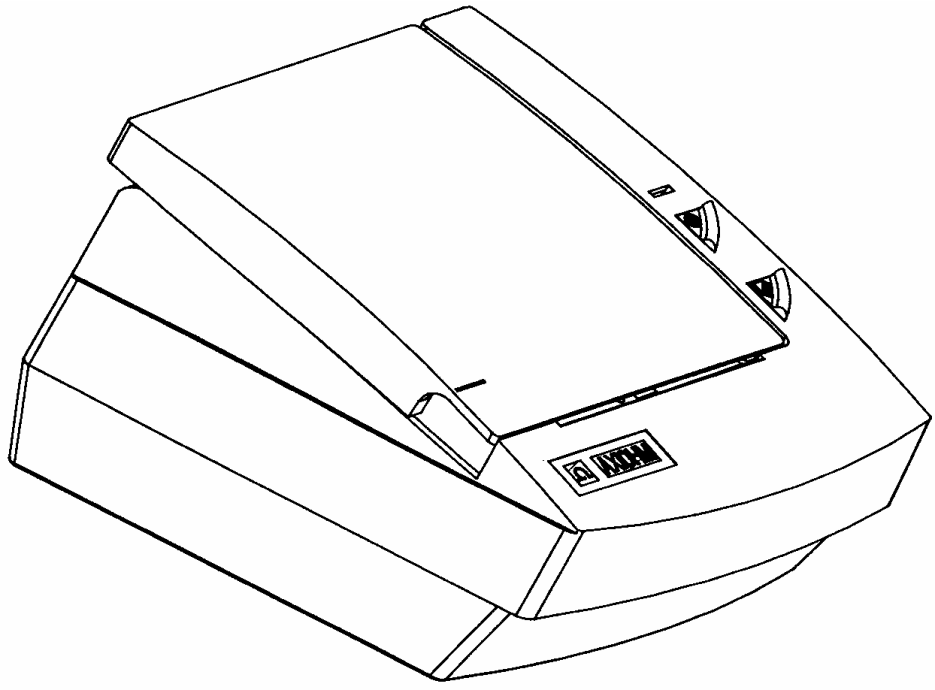
THERMAL PRINTING SOLUTIONS

APOS PREMIUM PRINTER SERIES

USER MANUAL

Reference 3107312 Issue A

August 2004



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EVOLUTIONS

Date	Issue	Modifications
07/02	Preliminary 1	
06/03	Preliminary 2	
07/03	Z	Creation
08/04	A	Added USB connection and easy font command

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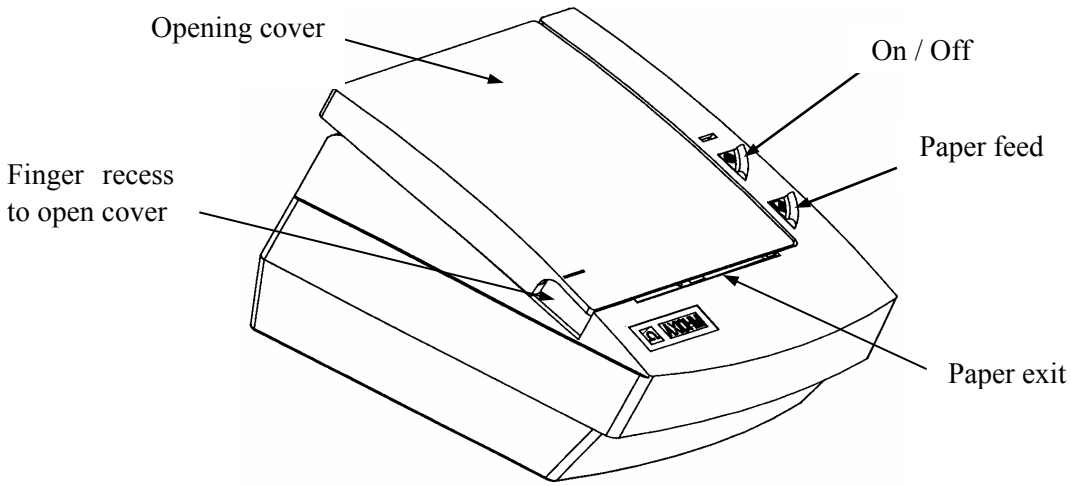
1 GENERAL DESCRIPTION

This set-up guide describes how to set up and operate the high-speed, thermal, point-of-sale (POS) printer manufactured by Axiohm SAS. The printer has many features, which give advantages to retailers, and is versatile enough to be used in other applications such as for printing out tickets and coupons.

- Axiohm's unique and patented paper-loading mechanism makes this printer the easiest-to-use POS printer on the market. The fixed-head thermal printer engine gives a very high quality print.
- An untrained operator can change the roll of paper quickly and reliably, minimizing downtimes and avoiding paper jams. There are no messy ribbons to change, so good print quality can be 'designed-in' without operator skills or regular maintenance.
- The printer uses thick-film technology to achieve the longest-life cutter with the optional patented semi-rotating ceramic cutter.
- As part of the total 'easy-to-use' philosophy, the printer uses a super-set of industry-standard software to allow for easy installation. The existing software needs no modification and is ready to use.
- The APOS printer will accurately print many barcodes, it allows custom characters to be downloaded and it can execute macro functions.

Interfaces offered: RS232 & USB for greatest compatibility



2 SPECIFICATIONS

2.1 Physical specification

2.1.1 Dimensions

Height	115mm
Width	170mm
Depth	205mm
Weight (with cutter)	1390 g

2.2 Print head specification

The APOS printer uses a fixed-head thermal print head, using thick-film techniques to ensure the highest performance.

Print head type	**Thermal line**
Printing width:	72 mm
Number of dots across width:	576
Resolution (dot-density):	8 dots / mm

2.2.1 Power supply

The printer requires a power supply of 24V at 2,2A minimum.
Other voltages, which are required internally for the micro controller and the communications ports, are generated internally from the 24V supply.

Specification:

Output voltage: 24 VDC (no load)
Output current: 2.20 A mean continuously
14 A peak during 500 µs max (pulse cycle = 1ms)

The power supply should be a “SELV” type in order to meet safety standards.

2.3 Environmental specifications

2.3.1 Environmental conditions

Operating temperature:	+0°C - +50°C
Storage temperature:	-40°C - +85°C
Maximum humidity:	90% RH (non-condensing)

2.3.2 EMI and Safety standards applied

The printer is designed to meet the following requirements:

Europe — CE Marking:
Safety Standards:
EN 60950

North America

EMI: FCC Part 15 class A
Safety standard UL60950, CAN/CSA C22.2 60950

Conditions of acceptability

EMI is measured using Axiohm power supply adapter ref. 3107329

The printer is to be powered by a SELV circuit only

The communication connectors must be of SELV type only

Safety recommendations

The power supply should be installed so it can be accessed to enable power disconnection.

2.4 Operational performance

2.4.1 Paper specification

Paper width	80mm
Maximum paper roll diameter	83mm
(Maximum paper roll length)	82m (using 60gsm paper)
Recommended papers	AXIOHM ref 3101123 KANZAKI P350
Emulsion (sensitive) side	On outside of roll

* You must contact Axiohm if you wish to use an alternative type of paper; otherwise your warranty might not be valid and you could cause damage to your printer.

2.4.2 Speed

The printer is capable of printing at a maximum speed of 130mm/s with 20% of the dots on, provided that sufficient power supply current is available (See section 2.1.3 about power supply requirements).
The actual speed can also be affected by the data rate at which information is sent to the printer over the communication link. Sending large amounts of graphic data could reduce the actual speed.

2.4.3 Lifetime

The printer lifetime depends on the actual operating conditions and is defined by the MTBF of the electronics and the wear characteristics of the electromechanical parts. The actual lifetime will therefore be the minimum of the following three categories, depending on the particular application:

- Electronic MTBF of 220,000 hrs of powered use
- 100km of paper used by the printer (with typically 20% of the dots heated)
- Two million cuts from the ceramic cutter mechanism.

2.5 Characters

2.5.1 Print Modes

- Available print modes:
- Standard
- Compressed
- Double High
- Double Wide
- Upside Down
- Rotated
- Underlined
- Bold
- Reverse
- Italic
- Scaled

2.5.2 Size

Characters sizes for the Standard and Compressed modes:

Standard

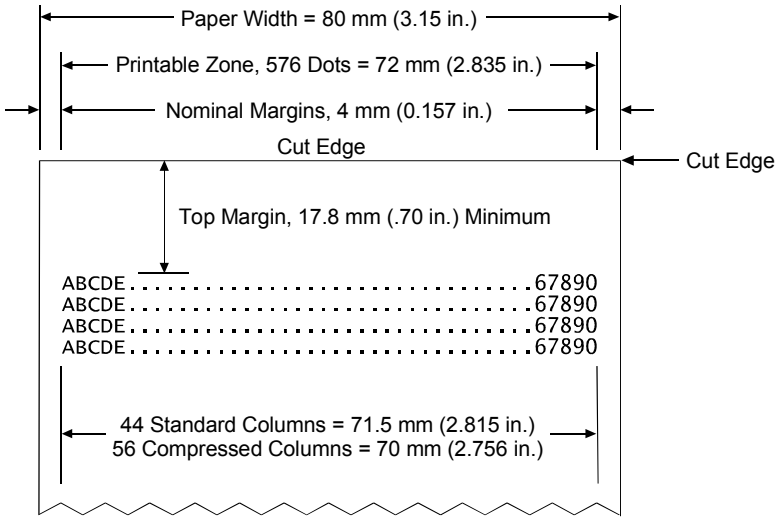
- Characters per Inch: 15.6
- Characters per Line: 44
- Cell Size: 13 x 24 Dots

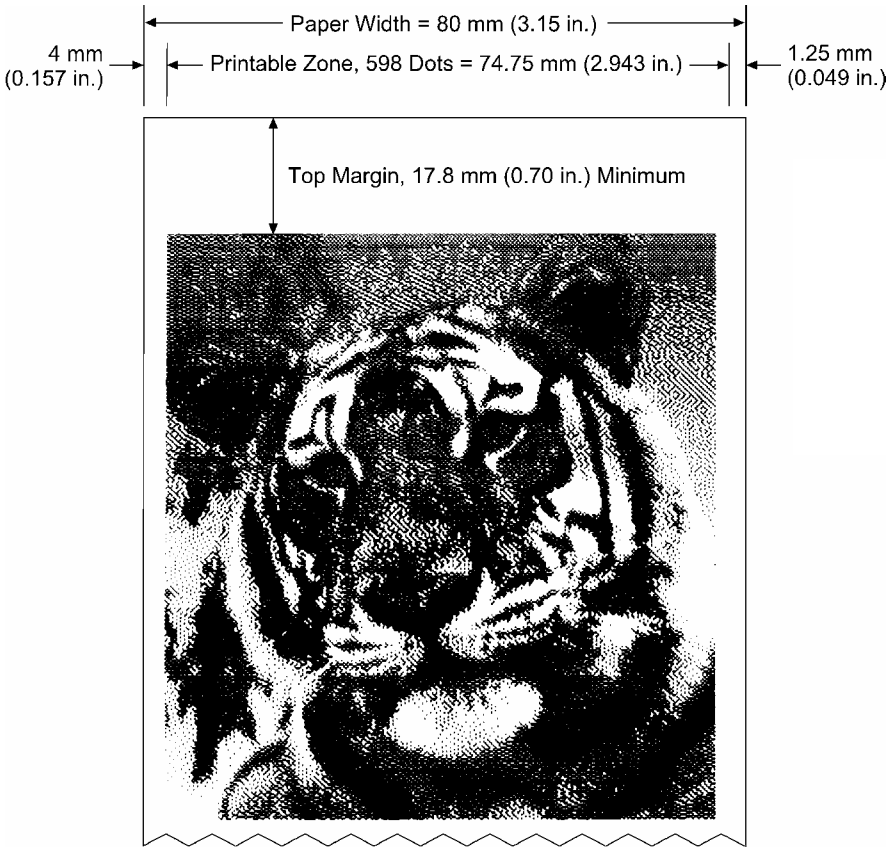
Compressed

- Characters per Inch: 20.3
- Characters per Line: 56
- Cell Size: 10 x 24 Dots

2.5.3 Print zone

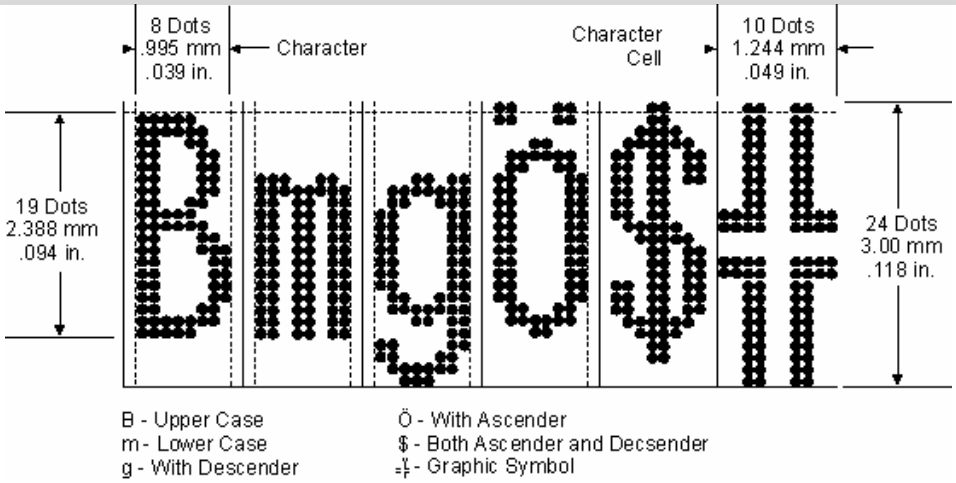
576 dots (addressable) @ 8 dots/mm, centered on 80 mm
Standard Mode: minimum margins: 2.5 mm (.098 inches)
Top margin to knife cut: 17.8 mm (0.70 inches)


Paper Width = 80 mm (3.15 in.)
Printable Zone, 576 Dots = 72 mm (2.835 in.)
Nominal Margins, 4 mm (0.157 in.)
Cut Edge
Cut Edge
Top Margin, 17.8 mm (.70 in.) Minimum
ABCDE.....67890
ABCDE.....67890
ABCDE.....67890
ABCDE.....67890
44 Standard Columns = 71.5 mm (2.815 in.)
56 Compressed Columns = 70 mm (2.756 in.)

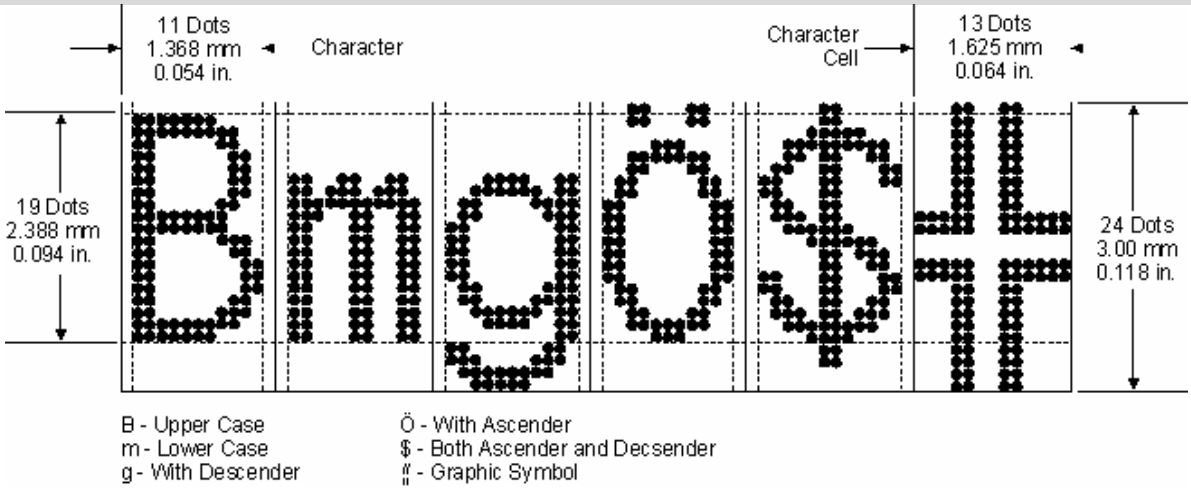


2.5.4 Resident font dimensions

10 x 24 Font



13 x 24 Font



2.5.5 Print density and density of receipt print lines

This function makes it possible to adjust the energy level of the print head to darken the printout. An adjustment should only be made when necessary. The factory setting is 100%.

Warning:
Choose an energy level no higher than necessary to achieve a dark printout.
Failure to observe this rule may result in a printer service call or voiding of the printer warranty.
Consult your Axiohm technical support specialist if you have any questions.

When printing lines at high dot coverage (text or graphics), the printer automatically slows down to limit power consumption below power supply setting (60W, 75W, 90W).

To change the Print Density:

a) Enter the Configuration Menu.
b) Select "Set Hardware Options" from Main Menu.

"Hardware Options Menu" is printed on the receipt and the question "Set Print Density?" asked.

c) Answer YES (Long click).

A warning is printed, followed by:
Print Density

80%	1 Click
90%	2 Clicks
100%	3 Clicks
110%	4 Clicks
120%	5 Clicks

Enter code, then hold Button DOWN at least 1 second to validate.

2.5.6 Printing duty cycle (printing solid blocks)

In order to guarantee the lifetime of the printer and meet safety standards, receipt printing should not exceed a 40 % of the duty cycle (for example 2 sec print, 3 sec pause)

2.5.7 Character sets

2.5.7.1 Code Page 437

00 0	10 16	20 SP 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⋮ 176	C0 └ 192	D0 ╨ 208	E0 ∝ 224	F0 ≡ 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 æ 145	A1 í 161	B1 ▒ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 Æ 146	A2 ó 162	B2 ▓ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 │ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 ñ 164	B4 ┤ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 ╡ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 å 134	96 û 150	A6 ª 166	B6 ╢ 182	C6 ╞ 198	D6 ╓ 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 ╖ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ÿ 152	A8 ¿ 168	B8 ╕ 184	C8 ╚ 200	D8 ╪ 216	E8 ϕ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 Ö 153	A9 ⌐ 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 ∙ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ¢ 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC n 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D ¥ 157	AD ¡ 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E Pt 158	AE « 174	BE ╛ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F DEL △ 127	8F Å 143	9F ƒ 159	AF » 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF BLANK 255

2.5.7.2 Code Page 850

00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⁝ 176	C0 └ 192	D0 ð 208	E0 Ó 224	F0 ‗ 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 æ 145	A1 í 161	B1 ⁞ 177	C1 ┴ 193	D1 Đ 209	E1 ß 225	F1 ± 241
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03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 ⁝ 179	C3 ├ 195	D3 Ë 211	E3 Ò 227	F3 ¾ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 ñ 164	B4 ⁝ 180	C4 ─ 196	D4 È 212	E4 õ 228	F4 ¶ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 Á 181	C5 ┼ 197	D5 ı 213	E5 Õ 229	F5 § 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 å 134	96 û 150	A6 ª 166	B6 Â 182	C6 ã 198	D6 Í 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 À 183	C7 Ã 199	D7 Î 215	E7 þ 231	F7 ¸ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ÿ 152	A8 ¿ 168	B8 © 184	C8 ╚ 200	D8 Ï 216	E8 Þ 232	F8 º 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 Ö 153	A9 ® 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Ú 233	F9 ¨ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ⁝ 186	CA ╩ 202	DA ┌ 218	EA Û 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ø 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB Ù 235	FB ¹ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C ⁝ 124	8C î 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ý 236	FC ³ 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D Ø 157	AD ¡ 173	BD ¢ 189	CD ═ 205	DD ¦ ¦ 221	ED Ý 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E × 158	AE « 174	BE ¥ 190	CE ╬ 206	DE ì 222	EE ‗ 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F Å 143	9F ƒ 159	AF » 175	BF ┐ 191	CF ¤ 207	DF ▀ 223	EF ´ 239	FF 255

2.5.7.3 Code Page 852

00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⁝ 176	C0 └ 192	D0 đ 208	E0 Ó 224	F0 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 Ĺ 145	A1 í 161	B1 ▒ 177	C1 ┴ 193	D1 Đ 209	E1 ß 225	F1 ˝ 241
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03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 │ 179	C3 ├ 195	D3 Ë 211	E3 Ń 227	F3 ˇ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 Ą 164	B4 ┤ 180	C4 ─ 196	D4 ď 212	E4 ń 228	F4 ˆ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 ů 133	95 Ľ 149	A5 ą 165	B5 Á 181	C5 ┼ 197	D5 Ň 213	E5 ň 229	F5 § 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 ć 134	96 ľ 150	A6 Ž 166	B6 Â 182	C6 Ă 198	D6 Í 214	E6 Š 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 Ś 151	A7 ž 167	B7 Ě 183	C7 ă 199	D7 Î 215	E7 š 231	F7 ¸ 247
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0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A Ő 138	9A Ü 154	AA 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA ŕ 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ő 139	9B Ť 155	AB ź 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB Ű 235	FB ű 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C ť 156	AC Č 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ý 236	FC Ř 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D Ź 141	9D Ł 157	AD ş 173	BD + Z 189	CD ═ 205	DD Ţ 221	ED Ý 237	FD ř 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E × 158	AE « 174	BE + ż 190	CE ╬ 206	DE ů 222	EE ţ 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F Ć 143	9F č 159	AF » 175	BF ┐ 191	CF ¤ 207	DF ▀ 223	EF ´ 239	FF 255

2.5.7.4 Code Page 858

00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⁝ 176	C0 └ 192	D0 ð 208	E0 Ó 224	F0 – 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 æ 145	A1 í 161	B1 ▒ 177	C1 ┴ 193	D1 Đ 209	E1 ß 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 Æ 146	A2 ó 162	B2 ▓ 178	C2 ┬ 194	D2 Ê 210	E2 Ô 226	F2 ‗ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 │ 179	C3 ├ 195	D3 Ë 211	E3 Ò 227	F3 ¾ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 ñ 164	B4 ┤ 180	C4 ─ 196	D4 È 212	E4 õ 228	F4 ¶ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 Á 181	C5 ┼ 197	D5 € 213	E5 Õ 229	F5 § 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 å 134	96 û 150	A6 ª 166	B6 Â 182	C6 ã 198	D6 Í 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 À 183	C7 Ã 199	D7 Î 215	E7 þ 231	F7 ¸ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ÿ 152	A8 ¿ 168	B8 © 184	C8 ╚ 200	D8 Ï 216	E8 Þ 232	F8 º 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 Ö 153	A9 ® 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Ú 233	F9 ¨ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Û 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ø 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB Ù 235	FB ¹ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ý 236	FC ³ 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D Ø 157	AD ¡ 173	BD ¢ 189	CD ═ 205	DD ¦ ¦ 221	ED Ý 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E × 158	AE « 174	BE ¥ 190	CE ╬ 206	DE Ì 222	EE ¯ 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F Å 143	9F ƒ 159	AF » 175	BF ┐ 191	CF ¤ 207	DF ▀ 223	EF ´ 239	FF 255

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00 NUL 0	10 16	20 SP 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⁞ 176	C0 └ 192	D0 ╨ 208	E0 α 224	F0 ≡ 240
01 1	11 XON 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 À 145	A1 í 161	B1 ⁞ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 È 146	A2 ó 162	B2 ⁞ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 XOFF 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 ⁞ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ã 132	94 õ 148	A4 ñ 164	B4 ⁞ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 ⁞ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 Á 134	96 Ú 150	A6 ª 166	B6 ⁞ 182	C6 ╞ 198	D6 ╓ 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 ⁞ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 Ì 152	A8 ¿ 168	B8 ⁞ 184	C8 ╚ 200	D8 ╪ 216	E8 ϕ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 Ê 137	99 Õ 153	A9 Ò 169	B9 ⁞ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 ∙ 249
0A LF 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ⁞ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B 11	1B ESC 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B Í 139	9B ¢ 155	AB ½ 171	BB ⁞ 187	CB ╦ 203	DB ▉ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C Ô 140	9C £ 156	AC ¼ 172	BC ⁞ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC n 252
0D CR 13	1D GS 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D Ú 157	AD ¡ 173	BD ⁞ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ã 142	9E Pt 158	AE « 174	BE ⁞ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F SP 127	8F Â 143	9F Ó 159	AF » 175	BF ⁞ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF 255

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00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 א 128	90 נ 144	A0 á 160	B0 ⁝ 176	C0 └ 192	D0 ╨ 208	E0 ∝ 224	F0 ≡ 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ב 129	91 ס 145	A1 í 161	B1 ⁞ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 ג 130	92 ע 146	A2 ó 162	B2   178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 ד 131	93 ף 147	A3 ú 163	B3 ⁝ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ה 132	94 פ 148	A4 ñ 164	B4 ⁞ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 ו 133	95 ץ 149	A5 Ñ 165	B5 ⁞ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 ז 134	96 צ 150	A6 ª 166	B6 ⁞ 182	C6 ╞ 198	D6 ╓ 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ח 135	97 ק 151	A7 º 167	B7 ╖ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ט 136	98 ר 152	A8 ¿ 168	B8 ╕ 184	C8 ╚ 200	D8 ╪ 216	E8 Φ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 י 137	99 ש 153	A9 ⌐ 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 ∙ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A ך 138	9A ת 154	AA ¬ 170	BA ⁞ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B כ 139	9B ¢ 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB ⁞ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C ⁞ 124	8C ל 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC n 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ם 141	9D ¥ 157	AD ¡ 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E מ 142	9E Pt 158	AE « 174	BE ╛ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F ן 143	9F ƒ 159	AF ¤ 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF 255

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00 NUL 0	10 16	20 SP 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 ¦ 160	B0 ⁞ 176	C0 └ 192	D0 ⊥ 208	E0 α 224	F0 ≡ 240
01 1	11 XON 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 È 145	A1 ' 161	B1 ⁞ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 Ê 146	A2 ó 162	B2 ⁞ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 XOFF 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 ⁞ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 Â 132	94 Ë 148	A4 ¨ 164	B4 ⁞ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 Ï 149	A5 ³ 165	B5 ⁞ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 ¶ 134	96 û 150	A6 ¸ 166	B6 ⁞ 182	C6 ╞ 198	D6 ╓ 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 ¯ 167	B7 ⁞ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ¤ 152	A8 Î 168	B8 ⁞ 184	C8 ╚ 200	D8 ╪ 216	E8 ϕ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 ô 153	A9 ⌐ 169	B9 ⁞ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 ● 249
0A LF 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ⁞ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA • 250
0B 11	1B ESC 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ¢ 155	AB ½ 171	BB ⁞ 187	CB ╦ 203	DB ▉ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C £ 156	AC ¼ 172	BC ⁞ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC n 252
0D CR 13	1D GS 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D = 141	9D ù 157	AD ¾ 173	BD ⁞ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E À 142	9E Û 158	AE « 174	BE ⁞ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F SP 127	8F § 143	9F ƒ 159	AF » 175	BF ⁞ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF 255

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00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⣿ 176	C0 └ 192	D0 ╨ 208	E0 ∝ 224	F0 ≡ 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 æ 145	A1 í 161	B1 ⣿ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 Æ 146	A2 ó 162	B2 ⣿ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 ⣿ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 ñ 164	B4 ⣿ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 ⣿ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 å 134	96 û 150	A6 ª 166	B6 ⣿ 182	C6 ╞ 198	D6 ╓ 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 ⣿ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ÿ 152	A8 ¿ 168	B8 ⣿ 184	C8 ╚ 200	D8 ╪ 216	E8 ϕ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 Ö 153	A9 ⌐ 169	B9 ⣿ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 • 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ⣿ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ø 155	AB ½ 171	BB ⣿ 187	CB ╦ 203	DB ⣿ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C £ 156	AC ¼ 172	BC ⣿ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC n 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D Ø 157	AD ¡ 173	BD ⣿ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E Pt 158	AE « 174	BE ⣿ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F Å 143	9F ƒ 159	AF ¤ 175	BF ⣿ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF 255

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00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 А 128	90 Р 144	A0 а 160	B0 ⁝ 176	C0 └ 192	D0 ╨ 208	E0 р 224	F0 Ё 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 Б 129	91 С 145	A1 б 161	B1 ▒ 177	C1 ┴ 193	D1 ╤ 209	E1 с 225	F1 ё 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 В 130	92 Т 146	A2 в 162	B2 ▓ 178	C2 ┬ 194	D2 ╥ 210	E2 т 226	F2 Є 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 Г 131	93 У 147	A3 г 163	B3 │ 179	C3 ├ 195	D3 ╙ 211	E3 у 227	F3 є 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 Д 132	94 Ф 148	A4 д 164	B4 ┤ 180	C4 ─ 196	D4 ╘ 212	E4 ф 228	F4 Ї 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 Е 133	95 Х 149	A5 е 165	B5 ╡ 181	C5 ┼ 197	D5 ╒ 213	E5 х 229	F5 ї 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 Ж 134	96 Ц 150	A6 ж 166	B6 ╢ 182	C6 ╞ 198	D6 ╓ 214	E6 ц 230	F6 Ў 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 З 135	97 Ч 151	A7 з 167	B7 ╖ 183	C7 ╟ 199	D7 ╫ 215	E7 ч 231	F7 ў 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 И 136	98 Ш 152	A8 и 168	B8 ╕ 184	C8 ╚ 200	D8 ╪ 216	E8 ш 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 Й 137	99 Щ 153	A9 й 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 щ 233	F9 • 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A К 138	9A Ъ 154	AA к 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA ъ 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B Л 139	9B Ы 155	AB л 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB ы 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C М 140	9C Ь 156	AC м 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ь 236	FC № 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D Н 141	9D Э 157	AD н 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED э 237	FD ¤ 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E О 142	9E Ю 158	AE о 174	BE ╛ 190	CE ╬ 206	DE ▐ 222	EE ю 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F П 143	9F Я 159	AF п 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF я 239	FF 255

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00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 € 128	90 Not Used 144	A0 NBSP 160	B0 ° 176	C0 À 192	D0 Đ 208	E0 à 224	F0 ð 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 Not Used 129	91 ‘ 145	A1 ¡ 161	B1 ± 177	C1 Á 193	D1 Ñ 209	E1 á 225	F1 ñ 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 ‚ 130	92 ’ 146	A2 ¢ 162	B2 ² 178	C2 Â 194	D2 Ò 210	E2 â 226	F2 ò 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 ƒ 131	93 “ 147	A3 £ 163	B3 ³ 179	C3 Ã 195	D3 Ó 211	E3 ã 227	F3 ó 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 „ 132	94 ” 148	A4 ¤ 164	B4 ´ 180	C4 Ä 196	D4 Ô 212	E4 ä 228	F4 ô 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 … 133	95 • 149	A5 ¥ 165	B5 µ 181	C5 Å 197	D5 Õ 213	E5 å 229	F5 õ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 † 134	96 – 150	A6 ¦ 166	B6 ¶ 182	C6 Æ 198	D6 Ö 214	E6 æ 230	F6 ö 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ‡ 135	97 — 151	A7 § 167	B7 · 183	C7 Ç 199	D7 × 215	E7 ç 231	F7 ÷ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ˆ 136	98 ˜ 152	A8 ¨ 168	B8 ¸ 184	C8 È 200	D8 Ø 216	E8 è 232	F8 ø 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ‰ 137	99 ™ 153	A9 © 169	B9 ¹ 185	C9 É 201	D9 Ù 217	E9 é 233	F9 ù 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A Š 138	9A š 154	AA ª 170	BA º 186	CA Ê 202	DA Ú 218	EA ê 234	FA ú 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ‹ 139	9B › 155	AB « 171	BB » 187	CB Ë 203	DB Û 219	EB ë 235	FB û 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C Œ 140	9C œ 156	AC ¬ 172	BC ¼ 188	CC Ì 204	DC Ü 220	EC ì 236	FC ü 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D Not Used 141	9D Not Used 157	AD SHY 173	BD ½ 189	Í 205	DD Ý 221	ED í 237	FD ý 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ž 142	9E ž 158	AE ® 174	BE ¾ 190	Î 206	DE Þ 222	EE î 238	FE þ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F Not Used 143	9F Ÿ 159	AF ¯ 175	BF ¿ 191	Ï 207	DF ß 223	EF ï 239	FF ÿ 255

3 WARRANTY

The printers or spare parts are guaranteed for a standard period of one (1) year, beginning at the delivery date (ex-works).
AXIOHM can set specific warranty terms for any Customer asking for warranty extension or other services concerning the warranty process.

The printers are guaranteed against defective material and/or workmanship. The warranty covers only, and at AXIOHM's choice, the cost of repair or replacement by AXIOHM in its factory, after restitution by the customer of the printers or spare parts confirmed by AXIOHM to be defective (*excluding assembling, dismounting, shipping and other expenses)*.

The implementation of the warranty will not extend the warranty period.

Due to the complexity of the electronic and mechanical techniques used in the operation of such a printer, AXIOHM does not warranty problems resulting from an installation not according to the published specifications.

This warranty is subject to strict compliance with AXIOHM's technical instructions for installation, use and maintenance.

In particular, this warranty will not be valid for any defects due to:

- Use of thermal paper other than those recommended by AXIOHM.
- Incorrect maintenance.
- Defective installation or modification not approved by AXIOHM.
- Non-compliance, during any period, with the specified working conditions including the electrical power supply specifications.
- Abnormal wear or mechanical damage, including dot burning due to power overloads.
- Transportation in packaging other than the type of carton / foam insert in which the printer was originally packed.

Any transportation, storage or setting up which does not comply with the technical specifications given to the customer by AXIOHM, or its official distributor, will invalidate this warranty.

In no event shall AXIOHM assume any liability in excess of that defined above. It is agreed that AXIOHM will not be liable for any indemnity for accidents to persons, damage to property or for loss of earnings.

4 YOUR PRINTER

4.1 Getting ready to use the printer

4.1.1 Unpacking the printer

The printer comes in a plain cardboard carton and separate pockets for:

- One APOS printer
- One set-up guide
- One standard power supply with 24V power lead (optional)

The model number and serial number (including manufacturing week and batch number) of the printer will be marked on the exterior of the packaging.

Make sure that no parts are missing or damaged. Report any deficiency to your supplier as soon as possible after receiving the printer. The original packaging material should be kept to transport or return your printer, if necessary.

4.1.2 Description of printer parts

The APOS printer contains a patented easy-loading printer mechanism designed and manufactured by Axiohm. This mechanism consists of a main cavity into which a paper roll is dropped for loading. The thermal print head is in front of this cavity and a rubber roller is attached to the lid of the mechanism. When the lid is closed, the paper is trapped between the rubber roller and the print head to give close alignment and consistent pressure.

4.1.3 Buttons

The APOS printer has two buttons on the front panel:

The ON/OFF button is physically connected to the hard reset on the main controller board. Even when it is OFF, the printer is always powered.

The Paper Feed button's normal function is to advance paper when the unit is not printing. The button function may be disabled under software control and it can be used to control the action of a defined macro. This button also activates a self-test printout (see section 2.7).

4.1.4 LED Indicator

A rectangular green LED is used to indicate the basic status of the printer. The LED is "off" when the printer is off, and "on" under normal circumstances when the printer is on. It will flash when there is an "error condition" such as when it is out of paper.
An internal audible buzzer is activated as well when such "error condition" occurs.

4.1.5 Cutter

The printer may be fitted with Axiohm's patented semi-rotating ceramic cutter. It is split with one blade in the lower cavity and the other fitted to the lid. These blades are also correctly aligned when the lid is closed to make paper loading very easy and jam-free. Partial cuts or full cuts are possible under software control.

4.1.6 Connectors

The APOS printer can have up to 3 types of connectors:

Power connector: fitted to the base of the unit near the front. (See section 2.5.1 for detail)
Two interfaces connector: one is fitted to the base of the unit closer to the rear; a 9-pin D-type in the case of serial communication RS232. The other one is an USB connector.
Drawer kick-out connector: fitted at the rear of the printer. These appear as a RJ11 connector. (See section 2.5.3 for details)

4.1.7 Cable traps

Three clips are fitted into the base of the printer; they may be used to trap the power supply and interface cables into recessed channels in the base.

4.1.8 Mounting holes

There are two holes in the base of the printer that allow the printer to be attached to a vertical surface such as a wall or pillar. In this case, the printer should be mounted with the paper exiting from the top so that the roll does not fall out when opening the cover.

4.1.9 Sensors

The APOS printer is fitted with three sensors, which detect abnormal conditions:

Door-closed sensor: a micro-switch sensor. To avoid damaging the print head, when the door is open, printing is inhibited.
End-of-paper (EOP) sensor: detects the presence of paper near the print head. To avoid damaging the print head, when no paper is detected, printing is inhibited.
Cutter sensor: used to detect if the cutter is in its home position before commencing a cut, and on completion of a cut.

4.2 Choosing the proper location for your printer

The APOS printer may be installed in a variety of applications; but, to maintain optimum working conditions from your unit, the following recommendations should be followed:

- Avoid dirty or dusty locations, or those with excessive heat or humidity
- Choose a stable level base or solid wall on which to mount the printer
- Make sufficient space around the printer to ensure comfort while using your printer, including sufficient access to open the lid while changing paper.

4.3 Loading paper

It is extremely easy to load a new paper roll into the printer by following these simple steps:

- Open the cover and remove the old paper core;
- Drop the new roll into the reservoir so that it will rotate in the correct direction (i.e. so that the emulsion side of the paper rests against the print head)
- Hold the front edge of the paper outside the main cavity at the front of the printer
- Close the printer cover

4.4 Light indicator

When the light is on continuously, the printer is ready to operate.
When the light is flashing, this signals that an error has occurred.

4.5 Connectors & cables

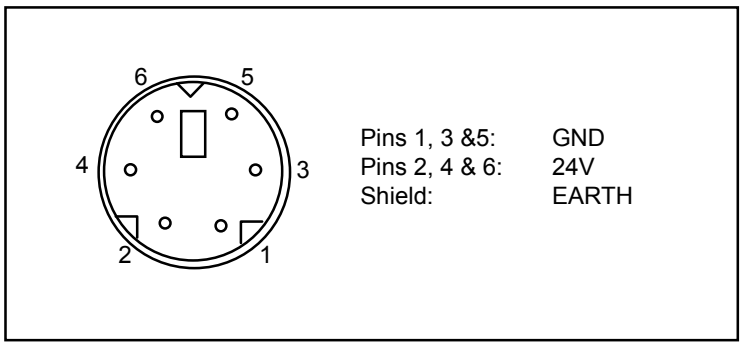
To reduce the electromagnetic emissions and susceptibility, all cables should be screened. If you are not using cables supplied by Axiohm for this purpose, please ensure that your cables match the printer and are rated at the appropriate voltage and current capacities.

All communication connectors should be SELV connectors in order to meet safety standards.

***Use of an inappropriate cable may seriously damage your printer!**

4.5.1 Power connector

The connector is a shielded 6-pin female mini-Din plug.

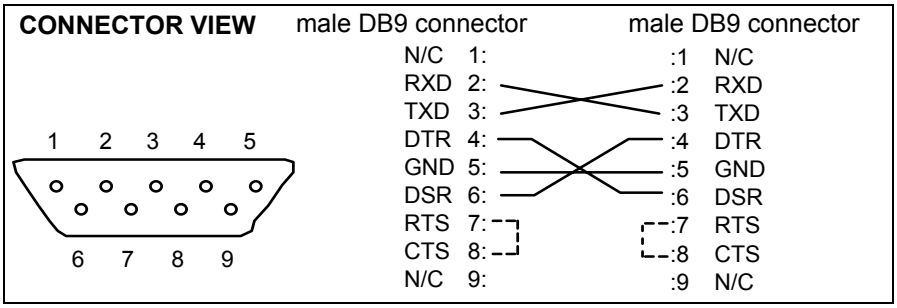


4.5.2 Communications interface connectors

The RS232 interface uses 9-pin D-type male connectors.

4.5.2.1 RS232 Connector

Cable for DTR/DSR protocol

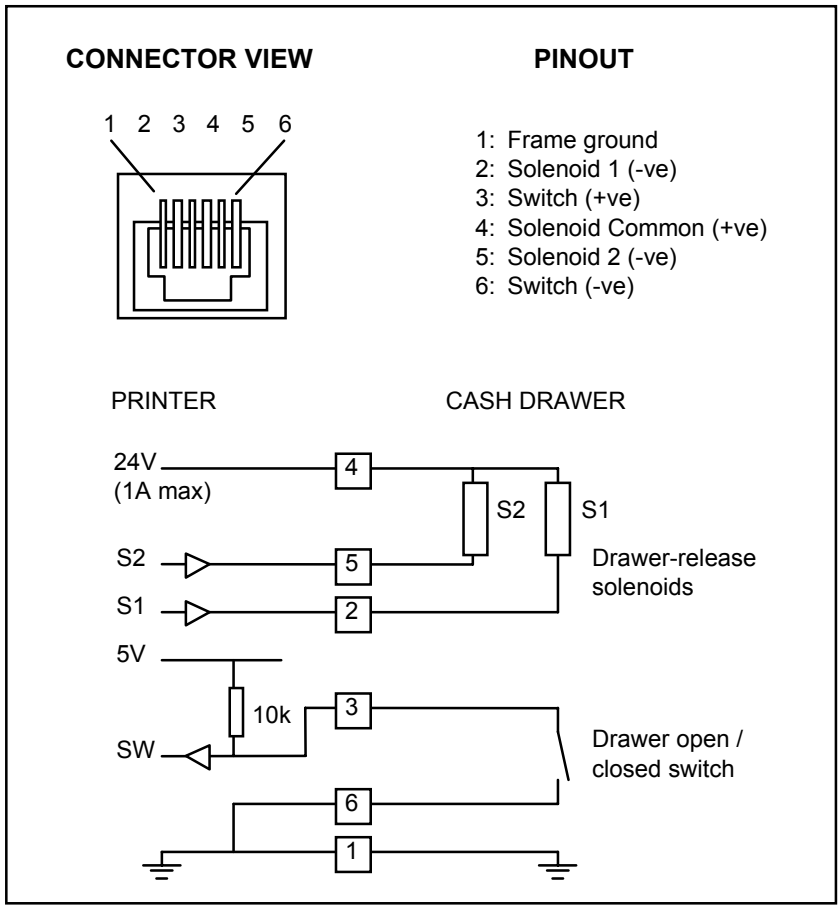


Note: RTS/CTS should be tied together if using DOS print commands on a PC station.

4.5.2.2 USB Connector

4.5.2.3 Drawer kick-out connector

The connector used to open a cash drawer and monitor, whether the drawer is opened or closed, is a 6-pin modular RJ11 connector.



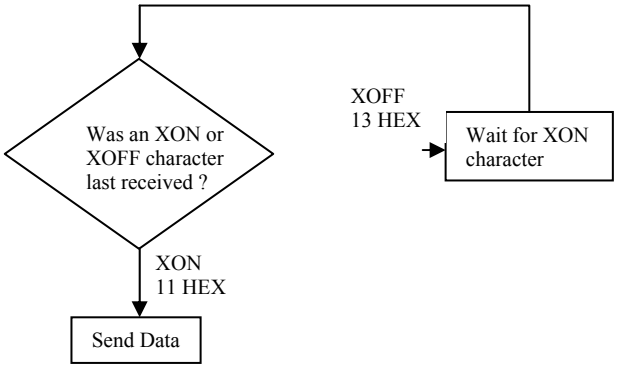
4.6 Communication Interface Control

4.6.1 RS232

The RS-232C interface uses either XON/XOFF (software) or DTR/DSR (hardware) protocol to control the flow of information between the computer and the printer.
In XON/XOFF mode, a particular character is sent back and forth between the host and the printer to regulate the communication.
In DTR/DSR mode, changes in the DTR/DSR signal on the RS-232C interface controls the information flow.

4.6.1.1 XON/XOFF Protocol

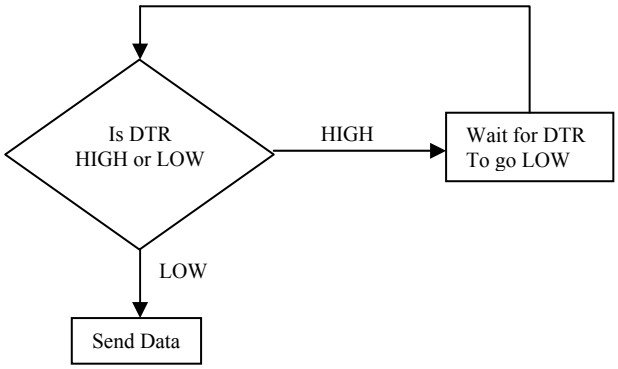
The XON/XOFF characters controls the information transfer between the printer and the host computer. The printer sends an XON character when it is ready to receive data and it sends an XOFF character when it cannot accept any more data. The software on the host computer must monitor the communication link as shown in the following flowchart in order to send data at the appropriate times.
If XON/XOFF has been selected, the printer also toggles the DTR signal, as described in the next section, but it does not look at the DSR signal to transmit data.



XON character = hexadecimal 11.
XOFF character = hexadecimal 13.

4.6.1.2 DTR/DSR Protocol

The DTR signal is used to control data transmission to the printer. It is driven low when the printer is ready to receive data and driven high when it cannot accept any more data.



4.6.2 USB PARAMETERS

Axiohm's implementation of USB complies with "Universal Serial Bus Specification" rev 1.1

4.6.2.1 Capabilities

Apos Premium is a device only, and doesn't provide hub capabilities.
Full speed communication (12Mbits/sec) is supported.

4.6.2.2 Connector

The connector is located at the rear of the printer, and is specified as B-type
Refer to USB specification rev 1.1 chapter 6 for more information.

4.6.2.3 Interface

The datas are exchanged between host and printer via five endpoints:

Endpoint 0x00 : CONTROL
Default endpoint

Endpoint 0x02 : BULK OUT
For transmission of all printable datas and commands except real time commands, from host to printer

Endpoint 0x83 : BULK IN
For return of all synchronous datas , status or other types of information except unsolicited status mode messages, from printer to host

Endpoint 0x81 : INTERRUPT IN
For return of asynchronous datas, typically unsolicited status mode messages, from printer to host

Endpoint 0x04 : INTERRUPT OUT
For transmission of real time commands, from host to printer.

4.6.2.4 Other information

- USB V1.1
- Full Speed communication 12 Mbits/sec
- Single USB Connector (Peripheral mode)

Vendor ID:
Axiohm USB Vendor Id = 0x05D9

Product Id:
APOS PREMIUM product Id = 0xA000

4.7 Self test description

The self-test ticket can be printed by pressing both Reset and Paper feed button and releasing the Reset button.
Here is the description of all the lines that you can read when you print a self-test.

Model Number: This is an 8 digit number fixed by Axiohm.

Serial Number: This is a 10 digit number fixed by Axiohm.*

*Serial number will be encoded as follows:

First letter:	C or D
Next two digits:	year of production
Next two digits:	week of production
Next 5 digits:	incremental number that is reset every Monday morning.

Example: **C or D030906623**
=> Board manufactured week 9 of the year 2003, 6623rd product manufactured that week.

Boot Firmware:

Revision	4 digit revision number fixed by Axiohm.
CRC	Boot code CRC.

Flash Firmware:

Revision	4 digit revision number fixed by Axiohm.
CRC	Flash Main code CRC.

Hardware:

Flash Memory Size	Total size of the flash memory.
Flash Logos/Fonts	Flash memory allocated for logos or user defined fonts.
Flash User Storage	Flash memory allocated for user data storage (ex: electronic journal).
SRAM Size	Total size of the RAM Memory
CPU Clock Freq.	Microprocessor Clock frequency.
Max Power	Maximum average power drawn from power supply

Mechanism:

Paper Type	Indicates the reference of the paper used matching with the mechanism.
Paper Width	Indicated the paper width used.
Print Density	Percentage of the nominal heating time value for specified paper.
Pre-Heating	This mode is used to maintain print head temperature above 35°c when enabled.
Max Speed	Printer's top speed.
Knife	Enable Knife Operation.
Partial Cut	Indicate the number of steps done to perform a partial cut.

Communication Interface:

RX Buffer Size	This indicates the size of the Receive buffer.
Interface Type	RS232 or USB interface.
Parameters (RS232 only)	
Baud Rate	Baud rate Value.
Data Bits	Number of data bits
Stop Bit(s)	Number of stop bit(s)
Parity	Type of parity to control frame validity
Flow Control	Hardware or software handshaking.
Reception Errors	Indicates which action is to be done when a wrong data is received.

Print Options:

Diagnostics	This line indicates in which mode the board is: - Off corresponds to normal operation - Data Scope is used to print data all datas received from the host in ASCII and HEX format.
Default LPI	Default inter-lines spacing.
Carriage Return	Select how to process a 0DH character received from the host.
Logo(s) defined	current status = YES if at least one logo is defined
User Char(s) defined	current status = YES if at least one character is defined

Revision Number: This is a 10 digit number that can be user defined

Codes Pages:

Default	Indicates default internal code page selected upon reset.
Resident	List of internal codes pages.

User Tallies:

Receipt Lines	Indicates the number of text lines printed.
Knife Cuts	Indicates the number of cuts performed.
Hours ON	Indicates the number of hours the board has been turned ON.
Flash cycles	Indicates the number of flash memory download cycles.
Knife Jams	Indicates the number of times that a cutter jam appeared.
Cover Openings	Indicates the number of cover opening/closing cycles.
Max temp reached	Indicates the maximum temperature (in C degrees) reached by the print head.
Head damaged	Indicates if the print head is damaged or not.

Note: Tallies are updated every 1 hour or 1000 lines printed, whichever comes first.

4.8 Configuration menu

Printers are generally shipped with all the functions and parameters pre-set at the factory. It is possible to change settings for various printer functions and to run certain tests using the configuration menu. Selecting functions or changing settings is done through the scrolling configuration menu feature. This feature prints instructions on the receipt for selecting and changing any of the functions and parameters.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

4.8.1 How to enter

- Push paper feed button
- Reset the printer and hold paper feed button.

4.8.2 How to adjust parameters

- After a self-test, the printer will enter in configuration menu.
  Follow all the instructions on the scrolling menu.
- Press the Paper Feed Button to make the selections.
  The instructions indicate whether to select something with a short click, a long click, or a series of short clicks. Indicate Yes with a long click, No with a short click.
- Press and hold the Paper Feed Button for at least one second for a long click. Press the Paper Feed Button quickly for a short click.

4.8.3 How to quit

At the end of your configuration, the printer asks for a reset and your configuration will be saved in the EEPROM.

- Reset the printer

4.8.4 List of parameters that can be changed

- Hardware Options
- Diagnostics Modes
- Communication Options
- Print Options

Set Hardware Options	**Set Communication Options**	**Set Diagnostics Mode**
Print density	Interface Type	Off
80%	RS232	Datascope
90%	USB	Receipt Test
100%	Baud Rate	
110%	115200	**Set Print Options**
120%	57600	Default LPI
Maximum Power	38400	6 LPI
60 W	19200	7.52 LPI
75 W	9600	CR Usage
90 W	4800	Ignore CR
Pre-Heating	2400	Print CMD
Enabled	1200	Queue Ticket Mode
Disabled	Data Bits	Disabled
Max Speed	8	Header First
100 mm/sec	7	Footer First
130 mm/sec	Stop Bit(s)	Default Font
Knife Option	1	User Defined
Enabled	2	Resident
Disabled	Parity	Default Code Page
Partial cut Distance	No Parity	437
125 Steps	Even Parity	850
130 Steps	Odd Parity	852
135 Steps	Flow Control	858
140 Steps	DTR/DSR	860
145 Steps	XON/XOFF	862
	Reception Errors	863
	Print '?'	865
	Ignore Errors	866
		1252
		Katakana

5 LIST OF CONTROL CODES

Control codes are non-printable characters or sequences of characters, which affect the subsequent operation of the printer. For your convenience, they are grouped in logical sets of commands, which can be used in the same context.

Code (Hexadecimal)	Command	Page
09	Horizontal Tab	49
0A	Print and Feed One Line	44
0C	Print and Return to Standard Mode	100
0D	Activate Carriage Return	44
10	Clear Printer	40
10 04 n	Real Time Status Transmission	96
10 05 n	Real Time Recovery From Fault	92
11 n1...nl	Print Raster Graphics	69
12	Select Double-Wide Characters	56
13	Select Single-Wide Characters	56
14 n	Feed *n* Print Lines	44
15 n	Feed *n* Dot Rows	45
16 n	Add *n* Extra Dot Rows	45
17	Print	46
18	Cancel Print Data in Page Mode	100
19	Perform Full Knife Cut	41
1A	Perform Partial Knife Cut	41
1B "BMP file"	Download BMP Logo	75
1B 07	Activate Internal Printer Buzzer	108
1B 0C	Print Data in Page Mode	101
1B 12	Select 90 Degree Counter-Clockwise Rotated Print	56
1B 14 n	Set Column	46
1B 16 n	Select Pitch (Column Width)	63
1B 20 n	Set Right-Side Character Spacing	49
1B 21 n	Select Print Mode	55
1B 24 n1 n2	Set Absolute Starting Position	50
1B 25 n	Select Character Set	66
1B 26 s c1 c2 n1 d1...nn dn	Define User-Defined Character Set	64
1B 27 m a2 a1 a0 d1 … dn	Write to User Data Storage	117
1B 2A m n1 n2 d1...dn	Select Bit Image Mode	70
1B 2D n	Select or Cancel Underline Mode	57
1B 2E m n rL rH d1 … dn	Print Advanced Raster Graphics	69
1B 32	Set Line Spacing to 1/6 Inch	46
1B 33 n	Set Line Spacing	47
1B 34 m a2 a1 a0	Read from User Data Storage	117
1B 3A 30 30 30	Copy Character Set from ROM to RAM	68
1B 3F n	Cancel User-Defined Character	66
1B 40	Initialize Printer	40

Code (Hexadecimal)	Command	Page
1B 44 [n]...k NUL	Set Horizontal Tab Positions	50
1B 45 n	Select or Cancel Emphasized Mode	57
1B 47 n	Select or Cancel Double Strike	58
1B 49 n	Select or Cancel Italic Print	58
1B 4A n	Print and Feed Paper	47
1B 4B n1 n2 d1...dn	Select Single-Density Graphics	72
1B 4C	Select Page Mode	101
1B 52 n	Select International Character Set	67
1B 53	Select Standard Mode	102
1B 54 n	Select Print Direction in Page Mode	102
1B 56 n	Select or Cancel 90 Degree Clockwise Rotated Print	59
1B 57 n1 n2...n8	Set Print Area in Page Mode	104
1B 59 n1 n2 d1...dn	Select Double-Density Graphics	72
1B 5B 7D	Switch to Flash Download Mode	110
1B 5C n1 n2	Set Relative Print Position	51
1B 61 n	Select Justification	52
1B 63 34 n	Select Sensors to Stop Printing	43
1B 63 35 n	Enable or Disable Panel Button	117
1B 64 n	Print and Feed *n* Lines	48
1B 69	Perform Full Knife Cut	41
1B 6D	Perform Partial Knife Cut	41
1B 70 m n1 n2	Generate Solenoid Pulse	108
1B 74 n	Select International Character Set	67
1B 75 00	Transmit cash drawer status	77
1B 76	Transmit Paper Sensor Status	78
1B 7B n	Select or Cancel Upside-down Print Mode	59
1C 44 f8 t w h sL sH nL nH {d}	Download Double Byte Font	122
1C 45 f8	Download Double Byte Font Complete	123
1C 46 t	Read font information and checksum	123
1C 47 w h {d}	Download and print one character	124
1C 48	Check EasyFont compatibility	124
1C 4C f8 t w h {d}	Download Single Byte Font	121
1D 01	Return Flash Memory Size	110
1D 02 nn	Select Flash Memory Sector to Download	111
1D 03 n	Real Time Recovery From Fault	92
1D 04 n	Real Time Status Transmission	94
1D 05	Real Time Printer Status Transmission	94
1D 06	Get Flash Firmware CRC Status	111
1D 07	Return Boot Sector CRC	111
1D 08	Return SRAM Size	89
1D 09	Return CPU Frequency	89
1D 0E	Erase All Flash Contents Except Boot Sector	112
1D 0F	Return Main Program Flash CRC	112
1D 10 n	Erase Selected Flash Sector	112

Code (Hexadecimal)	Command	Page
1D 11 al ah cl ch d1...dn	Download to Active Flash Sector	113
1D 21 n	Select Character Size	60
1D 22 n	Select Memory Type (SRAM/Flash)	115
1D 22 55 n1 n2	Flash Memory User Sectors Allocation	115
1D 23 n	Select the Current Logo	73
1D 24 nL nH	Set Absolute Vertical Print Position in Page Mode	105
1D 2A n1 n2 d1...dn	Define Downloaded Bit Image	74
1D 2F m	Print Downloaded Bit Image	75
1D 3A	Select or Cancel Macro Definition	107
1D 40 n	Erase User Flash Sector	116
1D 42 n	Select or Cancel White/Black Reverse Print Mode	61
1D 48 n	Select Printing Position of HRI Characters	97
1D 49 n	Transmit Printer ID	81
1D 49 40 n	Transmit Printer ID, Remote Diagnostics Extension	82
1D 4C nL nH	Set Left Margin	52
1D 50 x y	Set Horizontal and Vertical Minimum Motion Units	53
1D 56 m	Select Cut Mode and Cut Paper	42
1D 56 m n	Select Cut Mode and Cut Paper	42
1D 57 nL nH	Set Printing Area Width	53
1D 5C nL nH	Set Relative Vertical Print Position in Page Mode	106
1D 5E r t m	Execute Macro	107
1D 61 n	Select or Cancel Unsolicited Status Mode (USM)	85
1D 66 n	Select Pitch of HRI Characters	97
1D 68 n	Select Bar Code Height	99
1D 6B m d1...dk NUL	Print Bar Code	98
1D 6B m n d1...dk	Print Bar Code	98
1D 72 n	Transmit Status	88
1D 73 m n	Store selected sensor threshold in flash	89
1D 75 d0 d1 d2 d3 d4 d5 d6 d7	Store 10 characters user revision number in flash	54
1D 77 n	Select Bar Code Width	99
1D 78	Transmit 10 character user revision number	54
1D FF	Reset Firmware	40
1F 01 d1 ……dn	Erase Boot Sector + download new boot code	114
1F 02 n1 n2 n3 n4 n5 n6	Set Communication Interface Parameters	129
1F 03 00 n	Set Diagnostics Mode	130
1F 03 02 n	Set Knife Option	127
1F 03 04 n	Set Max Power Consumption	125
1F 03 0A n	Set Partial Cut Distance	127
1F 03 0B n	Set Preheating Option	126
1F 03 0F n	Set Default Font	128
1F 03 80 n	Set Default Code Page	131
1F 03 A0 n	Set Queue Ticket Mode	128
1F 05 n	Select Superscript or Subscript Modes	61
1F 06 n	Set New Boot Code Parameters	114

Code (Hexadecimal)	Command	Page
1F 0A n	Voltage and Temperature Monitoring	90
1F 0B 4E 52 4A n	Set Print Density	126
1F 0C 53 50 46 nL nH	Max Speed	125
1F 0D 43 4C 45 n	Reset EEPROM	132
1F 26 H cn cm ln [dn1…dnk] lm	Define user-Define Character Set With Variable Height	65
1F 56	Send Printer Software Version	90
1F 61 n	Process Ticket Counter	118
1F 62	Request Ticket Counter	118
1F 63 n	Set Cut Tag	119
1F 64	Request Cut Tag	119
1F 65 n	Return Logo Checksum	76
1F 69 n	Active user defined font selection	65
1F 74	Print Test Form	54
1F 76 n	Buffered status transmission	78
1F 77n	Return User Flash Memory Allocation Status	116

6 COMMAND DESCRIPTION

6.1 Command Conventions

The following information describes how each command is organized:

Command Name
A designation (not the ASCII code) used to identify the command.

Description
A brief summary of the command, followed by detailed information, if necessary.

ASCII	the ASCII control code
Hexadecimal	the Hexadecimal control code
Decimal	the Decimal control code

Value or Values	a description of the command operand values
Range	the upper and lower limits of the command operand
Default	the command operand default after printer reset
Formulas	any formula used for this command.

Exceptions
Describes any exceptions to this command, for example, other commands that the command cannot be used with.

Related Information
This section describes any related information for this command and provides references to other sections for additional information.

6.2 *Reset commands*

CLEAR PRINTER

Clears the print line buffer without printing and sets the printer to the following condition:

ASCII	DLE
Hexadecimal	**10**
Decimal	16

Exceptions
None

INITIALIZE PRINTER

Clears the print line buffer and resets the printer to the default settings for the startup configuration (refer to Default settings below).

Single Wide, Single-High, Non-Rotated, and Left-Aligned characters are set and User-defined characters or logo graphics are cleared.

ASCII	ESC @
Hexadecimal	**1B 40**
Decimal	27 64

Default

Character Pitch	15.6 CPI
Column Width	44 characters
Extra Dot Rows	3
Character Set	Default
Printing Position	Column One

Exceptions
None.

RESET FIRMWARE

Reboots the printer.

ASCII	GS (SPACE)
Hexadecimal	**1D FF**
Decimal	29 255

6.3 *Paper Cut commands*

PERFORM FULL KNIFE CUT

Cuts the receipt. Use either Hex 19 or Hex 1B 69.
There are two codes for this command. Both codes perform the same function.

ASCII	EM	ESC i
Hexadecimal	**19**	**1B 69**
Decimal	25	27 105

PERFORM PARTIAL KNIFE CUT

Partially cuts the receipt. The length of the cut can be changed through the configuration menu. The default setting leaves 0.20 inches (5 mm) of paper on the left edge. See Setting Partial Cut Distance in Diagnostics.
There are two codes for this command. Both codes perform the same function.

ASCII	SUB	ESC m
Hexadecimal	**1A**	**1B 6D**
Decimal	26	27 109

Formulas
The cut edge is 144 dot rows or 0.71 inch (18 mm) above the print station.

Exceptions
The command is valid only at the beginning of a line.

SELECT CUT MODE AND CUT PAPER

Selects a mode for cutting paper and cuts the paper. There are two formats for this command: one requiring one parameter *m*; the other requiring two parameters, *m* and *n*; the format is indicated by the parameter *m*.

ASCII	GS V *m*	GS V *m n*
Hexadecimal	**1D 56 *m***	**1D 56 *m n***
Decimal	29 86 *m*	29 86 *m n*

Value of *m* Selects the mode as shown in the table

Value of *n* Determines the cutting position

Operand: *m* = cut mode

n = additional distance to feed prior to cut beyond the cut position

Limit:	OPTION 1:		OPTION 2:	
	Decimal:	$0 \le m \le 1$ $48 \le m \le 49$	$65 \le m \le 66$	$0 \le n \le 255$
	Hex:	$00 \le m \le 01$ $30 \le m \le 31$	$41 \le m \le 42$	$00 \le n \le FF$

"GS V" OPERAND DEFINITION		
M		
Decimal	**Hex**	**Cut mode**
0, 48	00, 30	Full cut
1, 49	01, 31	Partial cut
65	41	Feeds paper *n* x vertical motion units beyond the cut position, then executes a full cut
66	42	Feeds paper *n* x vertical motion units beyond the cut position, then executes a partial cut

6.4 *Sensor commands*

SELECT SENSORS TO STOP PRINTING

Selects the paper sensor used to detect out-of-paper. The printer finishes printing the current line and feeds the paper before stopping.

ASCII	ESC c 4 *n*
Hexadecimal	**1B 63 34 *n***
Decimal	27 99 52 *n*

Value of *n* Sensor status

		Logical combination of bit1, bit 0	
Bit	**Sensor**	**00**	**01 or 10 or 11**
0-1	Receipt Paper Near-End	Disabled for paper out detection	Enabled for paper out detection

Bits 2- 7 are unused

Default	0

6.5 *Vertical Positioning and Print Commands*

The vertical positioning and print commands control the vertical print positions of characters on the receipt.

PRINT AND FEED ONE LINE

Prints one line from the buffer and feeds paper one line.

ASCII	LF
Hexadecimal	**0A**
Decimal	10

ACTIVATE CARRIAGE RETURN

Prints one line from the buffer and feeds paper one line. The printer can be set through the configuration menu to ignore or use this command. Some applications expect the command to be ignored, while others use it as print command.

ASCII	CR
Hexadecimal	**0D**
Decimal	13

Related Information
See Ignoring/Using the Carriage Return in *Diagnostics* for more information.

FEED *N* PRINT LINES

Feeds the paper *n* lines at the current line height without printing.

ASCII	DC4 *n*
Hexadecimal	**14 *n***
Decimal	20 *n*

Value of *n* The number of lines to feed at current line height setting.

Range of *n* 0-255

FEED *N* DOT ROWS

Feeds the paper *n* dot rows (*n*/203 inch, *n*/8 mm), without printing.

ASCII	NAK *n*
Hexadecimal	**15 *n***
Decimal	21 *n*
Value of *n*	*n*/203 inch
Range of *n*	0-255

ADD *N* EXTRA DOT ROWS

Adds *n* extra dot rows (*n*/203 inch, *n*/8 mm) to the character height to increase space between print lines or decrease the number of lines per inch.

ASCII	SYN *n*
Hexadecimal	**16 *n***
Decimal	22 *n*
Value of *n*	Number of extra dot rows
Range of *n*	0-16
Default	3 extra dot rows

Formulas

The following table shows the relationship between the number of lines per inch and each extra dot row added:

Extra Rows	Lines Per Inch	Dot Rows	Extra Rows	Lines Per Inch	Dot Rows
0	8.5	24	9	6.1	33
1	8.1	25	10	6.0	34
2	7.8	26	11	5.8	35
3	7.5	27	12	5.6	36
4	7.2	28	13	5.5	37
5	7.0	29	14	5.3	38
6	6.8	30	15	5.2	39
7	6.5	31	16	5.1	40
8	6.3	32			

PRINT

Prints one line from the buffer and feeds paper one line.

ASCII	ETB
Hexadecimal	**17**
Decimal	23

SET COLUMN

Prints the first character of the next print line in column *n*, which must be sent for each line not printed at column one. The value of *n* is set to one after each line.

ASCII	ESC DC4 *n*
Hexadecimal	**1B 14 *n***
Decimal	27 20 *n*

Value of n

1-44= Standard pitch 1-56= Compressed pitch

Default of *n* 1

Exceptions
This command cannot be used with Single or Double-Density graphics.

SET LINE SPACING TO 1/6 INCH

Sets the default line spacing to 1/6 of an inch (4,23 mm).

ASCII	ESC 2
Hexadecimal	**1B 32**
Decimal	27 50

SET LINE SPACING

Sets the line spacing to [*n* x horizontal or vertical motion units] .
The minimum line spacing is 8.5 lines per inch. The line spacing equals the character height when *n* is too small.
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (SetLine Spacing) will be interpreted accordingly.

ASCII	ESC 3 *n*
Hexadecimal	**1B 33 *n***
Decimal	27 51 *n*
Value of *n*	*N x vertical motion unit*
Range of *n*	0-255
Default	0.16 inch (4.23 mm)

Related Information
For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

PRINT AND FEED PAPER

Prints one line from the buffer and feeds the paper [*n* x horizontal or vertical motion units]. The line height equals the character height when *n* is too small.
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion units, the parameters of this command (Print and Feed Paper) will be interpreted accordingly.

ASCII	ESC J *n*
Hexadecimal	**1B 4A *n***
Decimal	27 74 *n*
Value of *n*	*n* x horizontal or vertical motion units
Range of *n*	0-255

Related Information
For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

PRINT AND FEED *N* LINES

Prints one line from the buffer and feeds paper *n* lines at the current line height.

ASCII	ESC d *n*
Hexadecimal	**1B 64 *n***
Decimal	27 100 *n*
Range of *n*	1-255 (0 is interpreted as 1)

6.6 *Horizontal Positioning Commands*

The horizontal positioning commands control the horizontal print positions of characters on the receipt.

HORIZONTAL TAB

Moves the print position to the next tab position set by the Set Horizontal Tab Positions (1B 44 *n*1 *n*2 ... 00) command. The print position is reset to column one after each line.

Tab treats the left margin as column one; therefore changes to the left margin will move the tab positions.

When no tabs are defined to the right of the current position, or if the next tab is past the right margin, Line Feed is executed. HT has no effect in Page Mode.

Print initialization sets 32 tabs at column 9, 17, 25,

ASCII	HT
Hexadecimal	**09**
Decimal	9

SET RIGHT-SIDE CHARACTER SPACING

Sets the right side character spacing to [*n* x horizontal or vertical motion units]. Values for this command are set independently in standard and page mode.
The units of horizontal and vertical motion are specified by the Set Horizontal and Vertical Minimum Motion Units (GS P) command. Changes in the horizontal or vertical units do not affect the current right-side character spacing. When the horizontal or vertical motion unit is changed by the Set Horizontal and Vertical Minimum Motion Units (GS P) command the value must be in even units and not less than the minimum amount of horizontal movement.
In standard mode the horizontal motion unit is used.
In page mode the horizontal or vertical motion unit differs and depends on the starting position of the printable area. When the starting printing position is the upper left or lower right of the printable area (set by Select Print Direction in Page Mode, ESC T) the horizontal motion unit (*x*) is used. When the starting printing position is the upper right or lower left of the printable area (set by Select Print Direction in Page Mode, ESC T) the vertical motion unit (*y*) is used.

ASCII	ESC SP *n*
Hexadecimal	**1B 20 *n***
Decimal	27 32 *n*

Range of *n*	0 – 32
Default	0

SET ABSOLUTE STARTING POSITION

Sets the print starting position to the specified number of dots (up to the right margin) from the beginning of the line. The print starting position is reset to the first column after each line.
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Absolute Print Position) will be interpreted accordingly.

ASCII	ESC $ *n1 n2*
Hexadecimal	**1B 24 *n1 n2***
Decimal	27 36 *n1 n2*

Value of *n* [*n* x horizontal or vertical motion units] = Number of dots to be moved from the beginning of the line

*n*1 = Remainder after dividing *n* by 256

*n*2 = Integer after dividing *n* by 256

The values for *n*1 and *n*2 are two bytes in low byte, high byte word orientation.

Formulas: The example shows how to calculate 280 dots as the absolute starting position.

280/256 = 1, remainder of 24

*n*1 = 24 *n*2 = 1

Related Information
This command is also used in graphics mode. See Graphics Commands in this document for more information.
For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

SET HORIZONTAL TAB POSITIONS

Sets up to 32 horizontal tab-position *n* columns from column one, but does not move the print position. See the Horizontal Tab command (09).
The tab positions remain unchanged if the character widths are changed after the tabs are set. The command ends with hexadecimal 00; hexadecimal 1B 44 00 clears all tabs.

ASCII	ESC D [*n*]...*k* NUL
Hexadecimal	**1B 44 [*n*]…*k* NUL**
Decimal	27 68 [*n*]...*k* 0

Value of *n* Column number for tab minus one
(*n* is always less than or equal to the current selected column width)

Value of *k* 0-32

Default Every 8 characters from column. 1 (9, 17, 25, etc.) for normal print

Formulas: Set the tab positions in ascending order and put Hex 00 at the end.
Hex 1B 44 00 (number of tabs not specified) clears all tab positions.

Exceptions: The tabs cannot be set higher than the column width of the current pitch:

1-44= Standard pitch
1-56= Compressed pitch

SET RELATIVE PRINT POSITION

Moves the print-starting position the specified number of dots times horizontal motion unit either right (up to the right margin) or left (up to the left margin) of the current position. The print starting position is reset to the first column after each line.

ASCII	ESC \ *n1 n2*
Hexadecimal	**1B 5C *n1 n2***
Decimal	27 92 *n1 n2*

Value of *n*
To Move the Relative Starting Position Right of the Current Position:
[*n* x horizontal or vertical motion units] = Number of dots to be moved right of the current position
n1 = Remainder after dividing *n* by 256
n2 = Integer after dividing *n* by 256
The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

To Move the Relative Starting-Position Left of the Current Position:
[*n* x horizontal or vertical motion units] = Number of dots to be moved left of the current position
n1 = Remainder after dividing (65,536-*n*) by 256
n2 = Integer after dividing (65,536-*n*) by 256
The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

Formulas
To move to the left:
The example shows how to set the relative position 20 dots to the left of the current position.
65,536-20 = 65516
65,516/256 = 255, remainder of 236
n1 = 236, *n2* = 255

To move to the right:
The example shows how to set the relative position 20 dots to the right of the current position.
20/256 = 0, remainder of 20
n1 = 20, *n*2 = 0

Related Information
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Relative Print Position) will be interpreted accordingly. For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

SELECT JUSTIFICATION

Specifies the alignment of characters, graphics, logos, and bar codes (see the value of *n* table).

ASCII	ESC a *n*
Hexadecimal	**1B 61 *n***
Decimal	27 97 *n*
Value of *n*	0, 48 = Left aligned 1, 49 = Center aligned 2, 50 = Right aligned
Range of *n*	0-2, 48-50
Default	0 (Left aligned)

Exceptions :
The command is valid only at the beginning of a line.

SET LEFT MARGIN

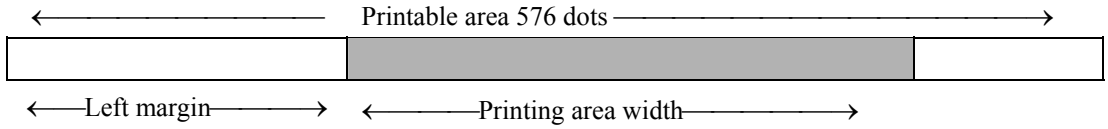
Sets the left margin of the printing area. The left margin is set to (((*nH* X 256) + *nL*) times horizontal motion unit) inches. The Set Horizontal and Vertical Minimum Motion Units command (1D 50) sets the horizontal motion units. This command is described below.
The Set Printing Area Width command (1D 57), which follows this command, sets the width of the printing area. See the Set Printing Area Width command (1D 57) in this document for a description of that command.
If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots. See the illustration.

ASCII	GS L *nL nH*
Hexadecimal	**1D 4C *nL nH***
Decimal	29 76 *nL nH*
Range of *nL*	0-255
Range of *nH*	0-255
Default	576 dots (the maximum printable area).

Formulas
To set the left margin to one inch at the horizontal motion unit of 1/203 inches, send the four-byte string:
GS L 203 0

Or, to set the left margin to two inches at the horizontal motion unit of 1/203 units per inch, send the four-byte string: GS L 150 1

Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



SET HORIZONTAL AND VERTICAL MINIMUM MOTION UNITS

Sets the horizontal and vertical motion units to 1/*x* inch and 1/*y* inch respectively.
When *x* or *y* is set to 0, the default setting for that motion unit is used.

ASCII	GS P *x y*
Hexadecimal	**1D 50 *x y***
Decimal	29 80 *x y*

Value of *x*	Horizontal
Value of *y*	Vertical
Range of *x*	0 – 255
Range of *y*	0 - 255
Default of *x*:	180
Default of *y*:	360

SET PRINTING AREA WIDTH

Sets the width of the printing area. If the setting exceeds the printable area, the maximum value of the printable area is used. The width of the printing area is set to (((*nH* X 256) + *nL*) times horizontal motion unit) inches. The Set Horizontal and Vertical Minimum Motion Units command (1D 50), described earlier in this document, sets the horizontal motion units.

The width of the printing area follows the Set Left Margin command (1D 4C). See the Set Left Margin command (GS L) earlier in this document for a description.

ASCII	GS W *nL nH*
Hexadecimal	**1D 57 *nL nH***
Decimal	29 87 *nL nH*

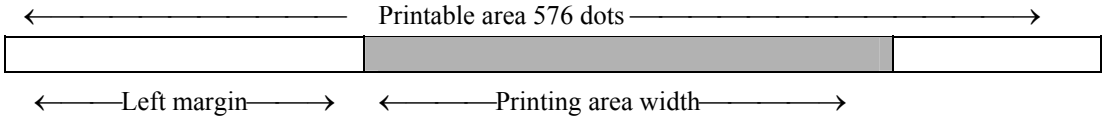
Range of *nL*	0-255
Range of *nH*	0-255
Default	576 dots (the maximum printable area).

Formulas

To set the width of the printing area to one inch at the horizontal motion unit of 1/203 inches, send the four-byte string: GS W 203 0

Or, to set the width of the printing area to two inches at the horizontal motion unit of 1/203 units per inch, send the four-byte string: GS W 150 1

Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



Exceptions

This command is effective only at the beginning of a line.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots (see illustration).

6.7 Printer configuration

STORE 10 CHARACTERS USER REVISION NUMBER IN FLASH

This command will store a 10-character user defined revision number downloaded to the printer.

ASCII	GS u d0 d1 d2 d3 d4 d5 d6 d7 d8 d9	
Hexadecimal	**1D 75 d0 d1 d2 d3 d4 d5 d6 d7 d8 d9**	
Decimal	29 117 d0 d1 d2 d3 d4 d5 d6 d7 d8 d9	
Operand:	dn = downloaded revision number	
Limit:	Decimal:	32 ≤ dn ≤ 126
	Hex:	20 ≤ dn ≤ 7E
Default:	Decimal:	dn = 47
	Hex:	dn = 30

Note: The user defined revision number is printed on the configuration menu.

TRANSMIT 10 CHARACTERS USER REVISION NUMBER

This command will transmit the 10-character printable ASCII user defined revision number.

ASCII	GS x
Hexadecimal	**1D 78**
Decimal	29 120

Note: The returned revision number may contain a bit pattern that is valid for returned status. Care should be taken not to confuse this returned data with any other returned data.

PRINT TEST FORM

This command will print the configuration setting ticket repeatedly.

ASCII	US t
Hexadecimal	**1F 74**
Decimal	31 116

Note: This command will assert busy and will ignore all input data until all tickets have been printed.

6.8 Print Characteristics Commands

These commands control what the printed information looks like, selection of character sets, definition of custom-defined characters, and setting of margins. The commands are described in order of their hexadecimal codes.

SELECT PRINT MODE

Selects the print mode: standard, compressed, emphasized, underlined, double high or doublewide.

ASCII	ESC ! *n*
Hexadecimal	**1B 21 *n***
Decimal	27 33 *n*

Value of *n* See table

Value of *n*

Bit[1]	**Function**	**0**	**1**
Bit 0	Pitch (See chart below)	Standard Pitch	Compressed Pitch
Bit 3	Emphasized Mode	Canceled	Set
Bit 4	Double High	Canceled	Set
Bit 5	Double Wide	Canceled	Set
Bit 7	Underlined Mode	Canceled	Set (bar thickness = 2)

1 Bits 1, 2 and 6 are not used

Default 0 (for bits 0, 3, 4, 5, 7)

This command and select pitch (column width) command (1B 16-n) affect pitch selection.

Pitch	**Columns**	**CPI**
Standard	44	15.6
Compressed	56	20.3

Selects the print mode: Standard, compressed, emphasized, underlined, double high or doublewide.

Exceptions

Refer to the above table for exceptions.

Related Information

See the *Print Specifications Guide* for a description of standard and compressed character pitches.

SELECT DOUBLE-WIDE CHARACTERS

Prints doublewide characters. The printer is reset to singlewide mode after a line has been printed or the Clear Printer (10) command is received. Doublewide characters may be used in the same line with singlewide characters.

ASCII	DC2
Hexadecimal	**12**
Decimal	18

Exceptions
Doublewide characters may not be used in the same line with single or double-density graphics.

SELECT SINGLE-WIDE CHARACTERS

Prints singlewide characters. Singlewide characters may be used in the same line with doublewide characters.

ASCII	DC3
Hexadecimal	**13**
Decimal	19

Exceptions
Singlewide characters may not be used in the same line with single or double-density graphics.

SELECT 90 DEGREE COUNTER-CLOCKWISE ROTATED PRINT

Rotates characters 90 degrees counter-clockwise. The command remains in effect until the printer is reset or until a Clear Printer (10) or Cancel Rotated Print (1B 56) command is received.

ASCII	ESC DC2
Hexadecimal	**1B 12**
Decimal	27 18

Related Information
See “Summary of Rotated Printing” in this document.

SELECT OR CANCEL UNDERLINE MODE

Turns underline mode on or off. Underlines cannot be printed for spaces set by the Horizontal Tab, Set Absolute Start Position, or Set Relative Print Position commands.
Underline mode may also be turned ON and OFF with the Select Print Mode(s) command (1B 21). However with that command the bar thickness is not selectable.

ASCII	ESC - *n*
Hexadecimal	**1B 2D *n***
Decimal	27 45 *n*
Value of *n*	0, 48 = Cancel underline mode
	1- 7,49-55 = Select underline mode and bar thickness in number of dots
Default	0 (Cancel underline mode)

Exceptions
This command is ignored if *n* is out of the specified range.

SELECT OR CANCEL EMPHASIZED MODE

Starts or stops emphasized printing. The printer is reset to the standard print mode after a Clear Printer (10) command is received.

ASCII	ESC E *n*
Hexadecimal	**1B 45 *n***
Decimal	27 69 *n*
Value of *n*	0 = Off
	1 = On
	(When 0 and 1 are the Least Significant Bit, LSB)
Default	0 (Off)

Exceptions
Only the lowest bit of *n* is effective.
Emphasized printing cannot be used with bit-images or downloaded bit-images.

Related Information
This command and the Select Print Mode(s) command (1B 21) function identically. They should have the same setting when used together.

SELECT OR CANCEL DOUBLE STRIKE

Turns double strike mode on or off. (identical to Emphasized mode). The printer is reset to the standard print mode after a Clear Printer (10) command is received.

ASCII	ESC G *n*
Hexadecimal	**1B 47 *n***
Decimal	27 71 *n*
Value of *n*	0 = Off 1 = On (When 0 and 1 are the Least Significant Bit, LSB)
Default	0 (Off)

Exceptions

Only the lowest bit of *n* is effective.

Double-strike printing cannot be used with bit-images or downloaded bit-images.

SELECT OR CANCEL ITALIC PRINT

Turns Italic print mode on or off. The printer is reset to the standard print mode after a Clear Printer (10) command is received.

ASCII	ESC I *n*
Hexadecimal	**1B 49 *n***
Decimal	27 73 *n*
Value of *n*	0 = Off 1 = On (When 0 and 1 are the Least Significant Bit, LSB)
Default	0 (Off)

Exceptions

Only the lowest bit of *n* is valid.

SELECT OR CANCEL 90 DEGREE CLOCKWISE ROTATED PRINT

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is reset or until a Clear Printer (10) or Rotated Print (1B 12) command is received. See Summary of Rotated Printing in this document.

ASCII	ESC V *n*
Hexadecimal	**1B 56 *n***
Decimal	27 86 *n*
Value of *n*	0 = Cancel
	1 = Set
Default	0 (Cancel)

SELECT OR CANCEL UPSIDE DOWN PRINT MODE

Prints upside-down characters. The command may be combined with Clock Wise Rotated print (1B 56) or Counter Clock Wise Rotated print (1B 12). The character order is inverted in the buffer so text is readable. Only bit 0 is used. Bits 1-7 are not used. See Summary of Rotated Printing in this document for more information.

ASCII	ESC { *n*
Hexadecimal	**1B 7B *n***
Decimal	27 123 *n*
Value of *n*	0 = Cancel
	1 = Set
Default	0 (Cancel)

Exceptions
The command is valid only at the beginning of a line.
It cannot be used with right side up characters on the same line.

SELECT CHARACTER SIZE

Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 6, as follows:

Character Width Selection		
Hex	**Decimal**	**Width**
00	0	1 (normal)
10	16	2 (two times width)
20	32	3 (three times width)
30	48	4 (four times width)
40	64	5 (five times width)
50	80	6 (six times width)
60	96	7 (seven times width)
70	112	8 (eight times width)

Character Height Selection		
Hex	**Decimal**	**Height**
00	0	1 (normal)
01	1	2 (two times height)
02	2	3 (three times height
03	3	4 (four times height)
04	4	5 (five times height)
05	5	6 (six times height)
06	6	7 (seven times height)
07	7	8 (eight times height)

This command is effective for all characters (except for HRI characters).
In standard mode (non-page mode), the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90-degree clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.
In page mode, vertical and horizontal direction are based on the character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
The Select Print Mode (ESC !) command can also select or cancel double-width and double-height modes. However, the setting of the last received command is effective.

ASCII GS ! *n*
Hexadecimal **1D 21 *n***
Decimal 29 33 *n*

Value of *n* 1-8 = vertical number of times normal font
1-8 = horizontal number of times normal font
Range of *n* 00-07, 10-17, …, 70-77
Default of *n* 00 hexadecimal

Exceptions
If *n* is out of the defined range, this command is ignored.

SELECT OR CANCEL WHITE/BLACK REVERSE PRINT MODE

Turns on White/Black reverse printing mode. In White/Black reverse printing mode, print dots and non-print dots are reversed, which means that white characters are printed on a black background. When the White/Black reverse printing mode is selected it is also applied to character spacing which is set by Right-Side Character Spacing (ESC SP).
This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.
White/Black Reverse Print Mode does not affect bit image, downloaded bit image, bar code, HRI characters, and spacing skipped by Horizontal Tab (HT), Set Absolute Starting Position (ESC $), and Set Relative Print Position (ESC \).

ASCII	GS B *n*
Hexadecimal	**1D 42 *n***
Decimal	29 66 *n*

Value of *n*	0 = Off
	1 = On
	(When 0 and 1 are the Least Significant Bit, LSB)
Default	0 (Off)

Exceptions
Only the lowest bit of *n* is valid.

SELECT SUPERSCRIPT OR SUBSCRIPT MODES

Turns superscript or subscript modes on or off. This attribute may be combined with other characters size settings commands (12, 13, 1B 21 *n*, 1D 21 *n*)

ASCII	US ENQ *n*
Hexadecimal	**1F 05 *n***
Decimal	31 05 *n*

Value of *n*	0 = Normal character size
	1 = Select subscript size
	2 = Select superscript size
Default	0 (normal size)

Exceptions
This command is ignored if *n* is out of the specified range.

SUMMARY OF ROTATED PRINTING

The table shows the combinations of upside-down print, 90 degree clockwise rotated print, and 90-degree counterclockwise rotated print.
90-degree clockwise rotated and 90-degree counterclockwise-rotated print commands are mutually exclusive:

The setting of the last received command is effective.

The samples of the print show only the normal size characters. Doublewide and double-high characters are printed in the same orientation.

They may also be mixed on the same line.

Upside Down **1B 7B *n***	**Rotated CW** **1B 56 *n***	**Rotated CCW** **1B 12**	**Resulting Output**
Canceled	Canceled	Canceled	1 (See Below)
Canceled	Set	Canceled	2 (See Below)
Set	Canceled	Canceled	3 (See Below)
Set	Set	Canceled	4 (See Below)
Canceled	Canceled	Set	5 (See Below)
Set	Canceled	Set	6 (See Below)

Note: Right-side up and upside down print modes cannot be mixed on the same line.

6.9 Font commands

SELECT PITCH (COLUMN WIDTH)

Selects the character pitch for a print line

ASCII	ESC SYN *n*
Hexadecimal	**1B 16 *n***
Decimal	27 22 *n*
Value of *n*	0 = Standard pitch 1 = Compressed pitch
Default	0 (Standard pitch)

Formulas
The following table provides the print characteristics for both pitches on the receipt station.

Pitch	Columns	CPI
Standard	44	15.6
Compressed	56	20.3

Related Information
See *Print Specifications* for a description of both pitches.

DEFINE USER-DEFINED CHARACTER SET

Defines and enters downloaded characters into RAM. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the Initialize Printer command (1B 40) is received.
Any invalid byte (*s*, *c*1, *c*2, *n*1, *n*2) aborts the command.

ASCII	ESC & s c1 c2 n1 d1 ... nn dn
Hexadecimal	**1B 26 s c1 c2 n1 d1 ... nn dn**
Decimal	27 38 s c1 c2 n1 d1 ... nn dn

Values and Ranges

s = 3 (fixed value), the number of bytes (vertically) in the character cell

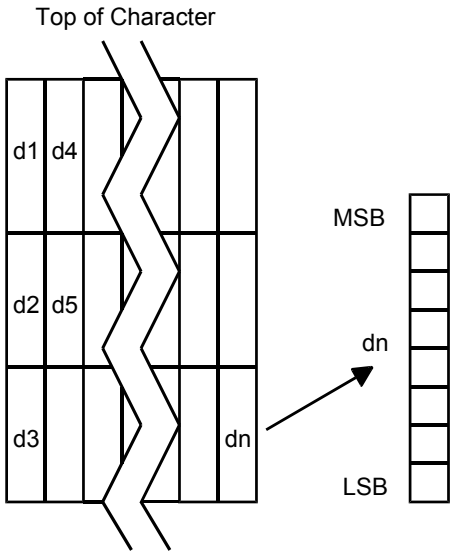
c = the ASCII codes of the first (c1) and last (c2) characters respectively
c1 = Hex 20-FF (20 is always printed as a space)
c2 = Hex 20-FF (20 is always printed as a space)
To define only one character, use the same code for both c1 and c2

n = the number of dot columns for the nth character as specified by n1 ... nn
n = 1-16

d = the column data for the nth character as specified by d1 ... dn

The number of bytes for a character cell is *s* x *n*1
The bytes are printed down and across each cell

See the illustration:



Related information
See 1D 22 n (Select memory type) to save User Defined characters.

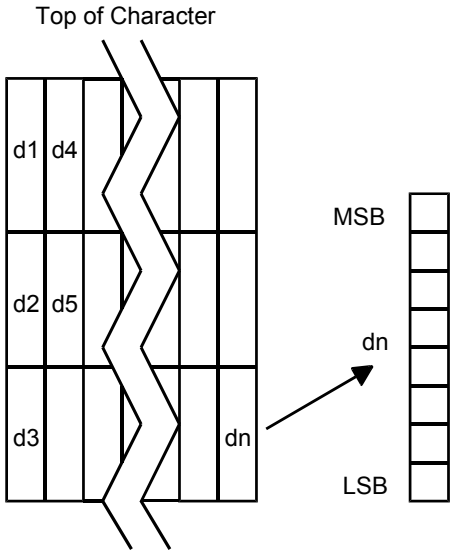
DEFINE USER-DEFINED CHARACTER SET WITH VARIABLE HEIGHT

Command format is similar to existing command 1B 26. The only difference resides in the height encoding H indicates the height in number of dots instead of number of byte (1B 26) to provide better resolution. Data are still encoded vertically.
max dimensions : Hmax = 64, Wmax = 48

ASCII	US & H cn cm ln [dn1…dnk] lm [dm1…dmk]
Hexadecimal	**1F 26 H cn cm ln [dn1…dnk] lm [dm1…dmk**
Decimal	31 38 H cn cm ln [dn1…dnk] lm [dm1…dmk]

Values and Ranges

Parameter H indicates character height in number of dots, and does not have to be dividable by 8.
From 1 to 8 dots high => 1 data byte per column
From 9 to 16 dots high => 2 data bytes per column
From 17 to 24 dots high => 3 data bytes per column
Etc…



ACTIVE USER-DEFINED FONT SELECTION

ASCII	US *i n*
Hexadecimal	**1F 69 n**
Decimal	31 105 n

n = 0, 1, 2, 3
default = 0
Selects the active user defined font used by commands 1B 26, 1F 26, 1B 25, 1B 3A, 1B 3F.
Setting remains unchanged until printer reboots, or command 1B 40 resets active user defined font to default.

CANCEL USER-DEFINED CHARACTER

Cancels the pattern defined for the character code specified by *n*. After the user-defined character is canceled, the corresponding pattern from current active ROM Code Page is printed.

ASCII	ESC ? *n*
Hexadecimal	**1B 3F *n***
Decimal	27 63 *n*
Range of *n*	32-255

Exceptions
This command is ignored if *n* is out of range or if the user-defined character is not defined.

SELECT CHARACTER SET

Selects the character set. When an undefined RAM character is selected, current active ROM Code Page character is used. See the *Printing Specification Guide* for the character sets.

ASCII	ESC % *n*
Hexadecimal	**1B 25 *n***
Decimal	27 37 *n*
Value of *n*	0 = Code Page 437
	1 = User Defined (RAM)
	2 = Code Page 850
Range of *n*	0-2
Default	0 (Code Page 437)

Selects the character set to be used. See *Print Specifications* for the character sets.
There are two codes for this command. Both codes perform the same function.

ASCII:	ESC R *n*	ESC t *n*
Hexadecimal:	**1B 52 *n***	**1B 74 *n***
Decimal:	27 82 *n*	27 116 *n*

n		
Decimal	**Hex**	**Code Page**
0	00	437 : US
1	01	850 : Multilingual
2	02	852 : Latin 2, Slavic
3	03	860 : Portuguese
4	04	863 : Canadian French
5	05	865 : Nordic
6	06	858 : Multilingual with Euro
7	07	866 : Cyrillic, Russian
8	08	1252 : Windows, Latin 1
9	09	862 : Hebrew
10	0A	Katakana
48	30	Easy Font single n°0
49	31	Easy Font single n°1
50	32	Easy Font single n°2
51	33	Easy Font single n°3
52	34	Easy Font double

Default 6 (Code Page **858**), selectable through configuration menu

Related Information
This command may also be known as Select International Character Set.

COPY CHARACTER SET FROM ROM TO RAM

Copies characters in the active ROM set to RAM. Use this command to re-initialize the User-Defined Character Set.

ASCII	ESC : 0 0 0
Hexadecimal	**1B 3A 30 30 30**
Decimal	27 58 0 0 0

Default current active ROM Code Page

Related Information
To modify characters in one of the character set variations, such as Rotated Print, Select one of the Rotated Print commands, copy to RAM, then use the Define User-Defined Character Set command (1B 26).

6.10 Graphics Commands

These commands are used to enter and print graphics data and are described in order of their hexadecimal codes.

PRINT RASTER GRAPHICS

Prints one row of data. *n*1 . .. *n*l: bytes describing the line to print.

ASCII	DC1 n1 ...nl
Hexadecimal	**11 n1 ...nl**
Decimal	17 n1 ...nl
Value of *n*	*n1*...*n72* = Data bytes
Range	0-255

Exceptions
Raster graphics is not available in Page Mode.

PRINT ADVANCED RASTER GRAPHICS

Prints a horizontal raster of graphics data one or multiple times. Horizontal offset and number of data bytes are variable and specified by parameters.

ASCII	ESC . *m n* rL rH d1 ... *d*n
Hexadecimal	**1B 2E *m n* rL rH d1 ... *d*n**
Decimal	27 46 *m n* rL rH d1 ... *d*n
Value of *m* :	horizontal offset from left margin = 8 x m dots
Value of n :	number of data bytes that compose the raster
Value of r :	number of times the raster has to be printed = 256 x rH + rL
d1 … dn :	Data bytes

Range

0 ≤ m ≤ 72
0 ≤ n ≤ 72
0 ≤ r ≤ 65535
0 ≤ d1…dn ≤ 255

Exceptions
Advanced Raster graphics is not available in Page Mode.

SELECT BIT IMAGE MODE

Sets the print resolution and enters one line of graphics data into the print buffer. Excess data is accepted but ignored. Any print command is required to print the data, after which the printer returns to normal processing mode. See the illustration for graphic representations of the bit image.

ASCII	ESC * *m* *n*1 *n*2 *d*1 ... *d*n
Hexadecimal	**1B 2A *m* *n*1 *n*2 *d*1 ... *d*n**
Decimal	27 42 *m* *n*1 *n*2 *d*1 ... *d*n

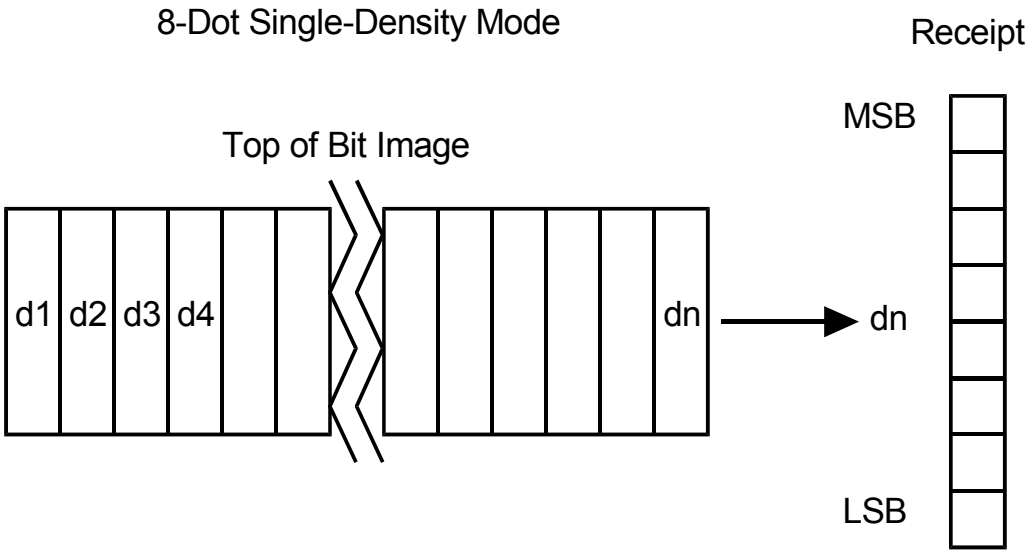
Value of *m*

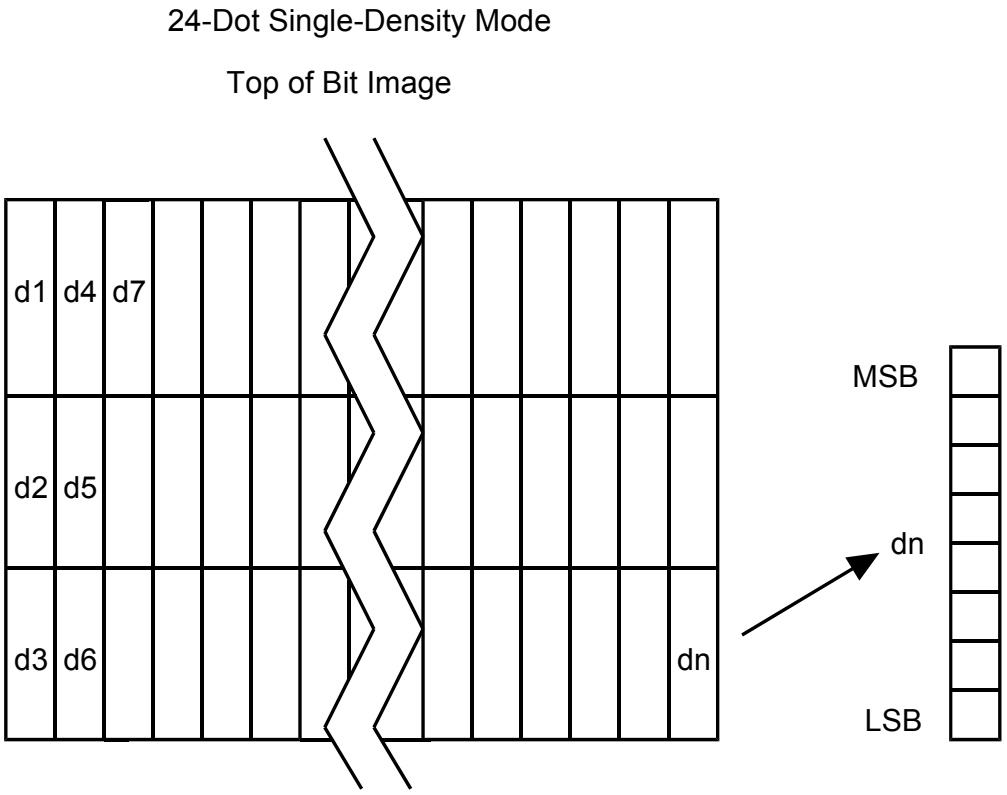
Value of *m*	Mode	No. of Dots (Vertical)	No. of Dots (Horizontal)	No. of Dots/Line
0	8 Dot Single Density	8 (68 DPI)	0-288 (101 DPI)	8 x 288
1	8 Dot Double Density	8 (68 DPI)	0-576 (203 DPI)	8 x 576
32	24 Dot Single Density	24 (203 DPI)	0-288 (101 DPI)	24 x 288
33	24 Dot Double Density	24 (203 DPI)	0-576 (203 DPI)	24 x 576

Value of *n*

Value of *n* (8-Dot Single Density Mode)	Value of *n* (24-Dot Single Density Mode)	Value of *d*
*n*1 + (256 x *n*2)	3 x [*n*1 + (256 x *n*2)]	Number of Bytes of Data (Printed Down, Then Across)

Related Information





SELECT SINGLE-DENSITY GRAPHICS

Enters one line of 8-dot single-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. Single-density mode allows 0-288 dot columns for 80-mm paper. The number of bytes sent is represented by the formulas in table.
Each bit corresponds to two horizontal dots. Compare to Set Bit Image Mode (1B 2A, m=0) earlier in this document.

ASCII	ESC K *n*1 *n*2 *d*1 ... *d*n
Hexadecimal	**1B 4B *n*1 *n*2 *d*1 ... *d*n**
Decimal	27 75 *n*1 *n*2 *d*1 ... *d*n

Value of *n*

Value of *n* (8-Dot Single Density Mode)	**Value of *n* (24-Dot Single Density Mode)**	**Value of *d***
*n*1 + (256 x *n*2)	3 x [*n*1 + (256 x *n*2)]	Number of Bytes of Data (Printed Down, Then Across)

Formulas
See the above table.

SELECT DOUBLE-DENSITY GRAPHICS

Enters one line of 8-dot double-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. Double-density mode allows 0-576 dot.
The number of bytes sent is represented by the formulas in the table.
Each bit corresponds to one horizontal dot. Compare to Set Bit Image Mode (1B 2A, m=1) earlier in this document.

ASCII	ESC Y *n*1 *n*2 *d*1 ... *d*n
Hexadecimal	**1B 59 *n*1 *n*2 *d*1 ... *d*n**
Decimal	27 89 *n*1 *n*2 *d*1 ... *d*n

Value of *n*

Value of *n* (8-Dot Single Density Mode)	**Value of *n* (24-Dot Single Density Mode)**	**Value of *d***
*n*1 + (256 x *n*2)	3 x [*n*1 + (256 x *n*2)]	Number of Bytes of Data (Printed Down, Then Across)

Formulas
See the above table.

6.11 Logo commands

SELECT THE CURRENT LOGO

Selects a logo to be defined or printed. The active logo *n* remains in use until this command is sent again with a different logo *n*.

When this command precedes a logo definition, that definition is stored in flash or RAM memory as logo *n*. If the logo is saved to flash (see command 1D 22 n), and if there is already a different definition in flash memory for logo *n*, the first is inactivated and the new definition is used. The inactive definition is not erased from flash and continues to take up space in flash memory.

When this command precedes a logo print command and *n* is different from the previously active logo selected, the printer retrieves the logo definition for *n* from memory and prints it. If there is no definition for logo *n*, then no logo is printed.

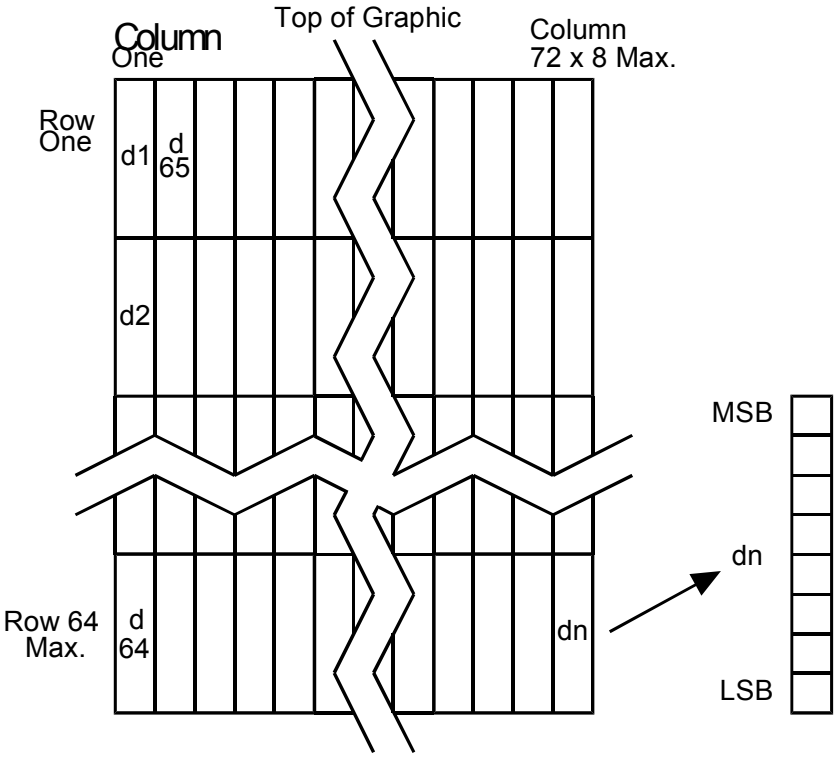
In the case of a previously existing application that expects only one possible logo, the printer will not receive the Select Current Logo (1D 23-n) command. In this case, the printer assigns 0 as the active logo identifier. It automatically stores any new logo definition in memory as logo 0, inactivating any previous logo 0 definition. If the flash memory space available for logos fills up with inactive logo 0 definitions, the firmware erases the old definitions at the next power cycle. This is the only case in which the printer erases flash memory without an application command.

In the case of a new application using multiple logos, the Select Current Logo (1D 23 *n*) command is used. After that, the printer no longer automatically erases the logo definition flash memory page when it fills with multiple definitions. A new application using multiple logos, writing a user-defined character set into flash memory, or both, is responsible for erasing the logo and user-defined character set flash memory page when the logo area is full or before a new character set is defined.

ASCII	GS # *n*
Hexadecimal	**1D 23 *n***
Decimal	29 35 *n*
Range of *n*	0 – 255

Enters a downloaded bit image (such as a logo) into RAM or Flash with the number of dots specified by *n*1 and *n*2. The downloaded bit image is available until power is turned off, another bit image is defined, or either Initialize Printer (1B 40), command is received.

See the illustration below for a graphic representation of the downloaded bit image.



ASCII	GS * *n*1 *n*2 *d*1 ... *d*n
Hexadecimal	**1D 2A *n*1 *n*2 *d*1 ... *d*n**
Decimal	29 42 *n*1 *n*2 *d*1 ... *d*n

Value of *n*

Value of n1	Value of n2	Value of d
1-72 (8 x *n*1 = Number of Horizontal Dot Columns)	1-64 (Number of Vertical Bytes)[1]	Bytes of Data (Printed Down, Then Across)

[1]The number of bytes sent is represented by the following formula:
n = 8 x *n*1 x *n*2 (*n*1 x *n*2 must be less than or equal to 4608).

Exceptions
See the illustration for the Print Downloaded Bit Image command (1D 2F) for a representation of the bit image.

DOWNLOAD BMP LOGO

Enters a downloaded BMP logo into RAM or Flash.
The downloaded BMP logo can be printed by using the Print Downloaded Image (1D 2F n) command.
To download a BMP file to save it as a logo, send the ESC (1Bh) character followed by the whole BMP file.
The printer decodes the BMP file header and will save the image data after checking important parameters, such as :

- Width
- Height
- Number of colors (only monochrome images are accepted)

ASCII	ESC	"BMP file"
Hexadecimal	**1B**	**"BMP file"**
Decimal	27	"BMP file"

Value Maximum width = 576
Maximum height = 512

Exceptions
BMP file images that are not monochrome are ignored.

Related Information
Microsoft BMP bitmap file format.
See command "Return Logo Checksum" (1F 65 n)

PRINT DOWNLOADED BIT IMAGE

Prints the downloaded bit image in RAM or Flash at a density specified by *m*. It is ignored if any data is in the print buffer, if the downloaded bit image is undefined.

See the illustration on the previous page for a representation of the bit image.

ASCII	GS / *m*
Hexadecimal	**1D 2F *m***
Decimal	29 47 *m*

Value and Range of *m*

Value of *m*	Print Mode	Vertical DPI[1]	Horizontal DPI*
0	Normal	203	203
1	Double Wide	203	101
2	Double High	101	203
3	Quadruple	101	101

[1]Dot density measured in dots per inch

RETURN LOGO CHECKSUM

Returns the checksum of a logo downloaded using “download BMP logo” or with “Define Downloaded Bit Image”.

ASCII	US e n
Hexadecimal	**1F 65 n**
Decimal	31 101 n

Returns 4 Bytes:
Command ID + Flag + checksum of the logo specified by n.

Byte 1 = 65h
Byte 2 = 01 - if logo n exists
- if logo n doesn’t exist.
Byte 3 = Checksum (LSB) or 00h if logo n doesn’t exist.
Byte 4 = Checksum (MSB) or 00h if logo n doesn’t exist.
Checksum is two’s complement of sum of **all** bytes in the download sequence.

Ex:
Checksum = -(0x1B + 0x42 + 0x4D + …)
for BMP logos

Checksum = -(0x1D + 0x2A + …)
for the “Defined Downloaded Bit Image” command.

6.12 Printer Status Commands

These commands enable the printer to communicate with the host computer. They are stored in the printer's data buffer as they are received, and are handled by the firmware in the order in which they were received.

When a fault occurs, the printer will go busy at the communication interface and not respond to either of the Printer Status commands. If the fault causing the busy condition can be cleared, such as by loading paper, or letting the thermal print head cool down, the printer will resume processing the data in its receive buffer.

Real Time commands allow the printer to function when it is busy at the communication interface. See the following section, Real Time Commands, for details about these commands.

TRANSMIT CASH DRAWER STATUS

This command returns the cash drawer sensor status.

ASCII	ESC u *n*
Hexadecimal	**1B 75 00**
Decimal	27 117 *0*

Value and Range of *n*

Value of n	Function	Description
00	CDKO	00 = CDKO is open 01 = CDKO is closed

TRANSMIT PAPER SENSOR STATUS

Sends status data to the host computer. The printer sends one byte to the host computer when it is not busy or in a fault condition. See the following table.

ASCII	ESC v
Hexadecimal	**1B 76**
Decimal	27 118

Values

Status Byte

Bit	Function	0 Signifies	1 Signifies
0	Undefined		
1	Receipt Cover	Closed	Open
2	Receipt Paper	Present	Out
3	Knife Position	Home Position	Not Home Position
4	Not Used	Fixed to Zero	Fixed to Zero
5	Temperature	In valid range	Too hot or too cold
6	Voltage	In valid range	Too high or too low
7	Not Used	Fixed to Zero	Fixed to Zero

Related Information
See Busy Line and Fault Conditions in the Real Time Commands section of this document for details about fault condition reporting.

BUFFERED STATUS TRANSMISSION

Returns the selected status when this command is processed as normal printer data.

ASCII	US v n
Hexadecimal	**1F 76 n**
Decimal	31 118 n

Operand:	*n* = status select
Limit:	Decimal: n = 5 or n = 7
	Hex: n = 05 or n= 07

"US v" RETURNED STATUS DEFINITION *n* = 5: PRINTHEAD STATUS *Two bytes are returned.*			
1st byte **Bit**	**Function**	**Value** **0**	**1**
0	Status for dots 0-63	OK	Damaged
1	Status for dots 64-127	OK	Damaged
2	Status for dots 128-191	OK	Damaged
3	Status for dots 192-255	OK	Damaged
4	Status for dots 256-319	OK	Damaged
5	Status for dots 320-383	OK	Damaged
6	Status for dots 384-447	OK	Damaged
7	Status for dots 448-511	OK	Damaged

2nd byte **Bit**	**Function**	**Value** **0**	**1**
0	Status for dots 512-575	OK	Damaged
1	Status for dots 576-639	OK	Damaged
2 to 7	Unused	Fixed to zero	

"US v" RETURNED STATUS DEFINITION *n* = 7: PRINTHEAD STATUS *80 bytes are returned.*			
1st byte **Bit**	**Function**	**Value** **0**	**1**
0	Status for dot 0	OK	Damaged
1	Status for dot 1	OK	Damaged
…	…	…	…
7	Status for dot 7	OK	Damaged

2nd byte **Bit**	**Function**	**Value** **0**	 **1**
0	Status for dot 8	OK	Damaged
1	Status for dot 9	OK	Damaged
…	…	…	…
7	Status for dot 15	OK	Damaged

80th byte **Bit**	**Function**	**Value** **0**	 **1**
0	Status for dot 632	OK	Damaged
1	Status for dot 633	OK	Damaged
…	…	…	…
7	Status for dot 639	OK	Damaged

TRANSMIT PRINTER ID

Transmits the printer model, type of version as defined below. This command is processed as normal printer data.

ASCII GS I *n*
Hexadecimal **1D 49 *n***
Decimal 29 73 *n*

Operand: *n* = printer ID select
Limit: Decimal: $1 \le n \le 4$; $49 \le n \le 52$; $65 \le n \le 68$
Hex: $01 \le n \le 02$; $31 \le n \le 32$; $41 \le n \le 44$

"GS I" OPERAND AND RETURNED STATUS DEFINITION

n		**Printer ID**	**Function**		**Value**	
Decimal	**Hex**				**Decimal**	**Hex**
1, 49	01, 31	Model	APOS		52	34
2, 50	02, 32	Type	Bit	Function	Value	
					0	1
			0	2-byte character code	Not installed	Installed
			1	Knife	No knife	Installed
			2	undefined		
			3	Undefined		
			4	Fixed	Always 0	-
			5	Undefined		
			6	Undefined		
			7	Fixed	Always 0	-
3, 51	03, 33	ROM version ID	00			
4, 52	04,34	Logo definition status	00 no logo in RAM 01 One logo in RAM			
65	41	Soft Version	Boot version \ Flash version			
66	42	Manufacturer name	AXIOHM			
67	43	Model Number	APOS PREMIUM			
68	44	SERIAL_ NUMBER	10 digits . depends on actual S/N			

Performs the remote diagnostic functions specified by *n*.
Each returned message is defined as: *n* + data + <CR>

ASCII	GS I @ *n*
Hexadecimal	**1D 49 40 *n***
Decimal	29 73 64 *n*

Values of *n* *(Refer to table)*

Value of *n*		**Remote diagnostic item**	**Function**
Hex	**Dec**		
20	32	Serial #, 10 digit ASCII	Write to NVRAM Example, send 14 bytes to printer: GS I @ 0x20 1234567890
21	33	Serial #	Write to NVRAM, and print on receipt to verify Example, send 14 bytes to printer: GS I @ ! 1234567890 This will print on receipt: Serial # written: 1234567890
23	35	Serial #	Return Serial #, preceded by *n* to identify Printer returns 12 bytes in above example: #1234567890<CR>
24	36	Class/model #, 15 digit ASCII	Write to NVRAM
25	37	Class/model #	Write to NVRAM, and print on receipt to verify
27	39	Class/model #	Return Class/model #, returns 17 bytes
2B	43	Boot firmware part #, 12 digit ASCII	Return Boot firmware part #, returns 14 bytes
2F	47	Boot firmware CRC, 4 digit ASCII	Return Boot firmware CRC, returns 6 bytes
33	51	Flash firmware part #, 12 digit ASCII	Return Flash firmware part #, returns 14 bytes
37	55	Flash firmware CRC, 4 digit ASCII	Return Flash firmware CRC, returns 6 bytes
80	128	Receipt lines tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM Example, send 12 bytes to printer: GS I @ Ç00010000 To set receipt lines tally to 10,000
81	129	Receipt lines tally	Write to NVRAM, and print on receipt to verify Example, send 12 bytes to printer: GS I @ ü00010000 This will print on receipt: Receipt tally written: 10,000

Value of *n*		Remote diagnostic item	Function
Hex	**Dec**		
82	130	Receipt lines tally	Clear receipt lines tally to 0
83	131	Receipt lines tally	Return receipt lines tally, preceded by *n* to identify Printer returns 10 bytes in above example: â00010000<CR>
84	132	Knife cut tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
85	133	Knife cut tally	Write to NVRAM, and print on receipt to verify
86	134	Knife cut tally	Clear knife cut tally to 0
87	135	Knife cut tally	Return knife cut tally, returns 10 bytes
90	144	Hours on tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
91	145	Hours on tally	Write to NVRAM, and print on receipt to verify
92	146	Hours on tally	Clear Hours on tally to 0
93	147	Hours on tally	Return Hours on tally, returns 10 bytes
97	151	Boot firmware version	Return Boot firmware version, returns 6 bytes
A3	163	Flash firmware version	Return Flash firmware version, returns 6 bytes
A4	164	Flash cycles tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
A5	165	Flash cycles tally	Write to NVRAM, and print on receipt to verify
A6	166	Flash cycles tally	Clear Flash cycles cut tally to 0
A7	167	Flash cycles tally	Return Flash cycles cut tally, returns 10 bytes
A8	168	Knife jams tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
A9	169	Knife jams tally	Write to NVRAM, and print on receipt to verify
AA	170	Knife jams tally	Clear Knife jams tally to 0
AB	171	Knife jams tally	Return Knife jams tally, returns 10 bytes
AC	172	Cover openings tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
AD	173	Cover openings tally	Write to NVRAM, and print on receipt to verify
AE	174	Cover openings tally	Clear Cover openings tally to 0
AF	175	Cover openings tally	Return Cover openings tally, returns 10 bytes
B2	178	MAX Temperature tally	Set MAX temp tally to -273
B3	179	MAX Temperature tally	Return Temperature tally

SELECT OR CANCEL UNSOLICITED STATUS MODE (USM)

Selects whether the printer is to automatically return a 4 bytes status string whenever the status changes.

ASCII	GS a *n*
Hexadecimal	**1D 61 *n***
Decimal	29 97 *n*

Value of n	0 turns mode off
	Any non-zero value turns mode on
Default	*n* = 0 (USM disabled)

Byte 1	=	Printer information
Byte 2	=	Error information
Byte 3	=	Paper information
Byte 4	=	Paper information

This command uses the same sequence as older ASB (Auto Status Back) but has the following differences:

- The parameter n is an on/off switch. It does not select trigger subset
- There is no immediate return when this mode is turned on

Any change in any of the following conditions will trigger the USM response

- Receipt Cover
- Knife Error
- Out of range Print head Temperature
- Out of range Voltage
- Paper exhaust Status
- Flow Control
- Paper Feed Button Status
- CDKO Status

"GS a" RETURNED STATUS DEFINITION BYTE 1: PRINTER STATUS			
		Value	
Bit	Function	0	1
0	fixed	Always 0	-
1	fixed	Always 0	-
2	CDKO	Open	Close
3	Printer Busy	Not Busy	Busy
4	fixed	-	Always 1
5	Cover Position	Closed	Open
6	Feed Switch	No Media Feed	Media Feeding
7	fixed	Always 0	-

"GS a" RETURNED STATUS DEFINITION BYTE 2: ERROR STATUS			
		Value	
Bit	Function	0	1
0	undefined		
1	undefined		
2	undefined		
3	Cutter Error Status	OK	Failure
4	fixed	Always 0	-
5	undefined		
6	Recoverable Error Status	OK	Failure
7	fixed	Always 0	-

"GS a" RETURNED STATUS DEFINITION BYTE 3: MEDIA SENSOR STATUS			
		Value	
Bit	Function	0	1
0	undefined		
1	undefined		
2	Media Out	Present	Out
3	Media Out	Present	Out
4	fixed	Always 0	-
5	undefined		
6	undefined		
7	fixed	Always 0	-

"GS a" RETURNED STATUS DEFINITION BYTE 4: MEDIA SENSOR STATUS			
		Value	
Bit	Function	0	1
0	undefined		
1	undefined		
2	undefined		
3	undefined		
4	fixed	Always 0	-
5	undefined		
6	undefined		
7	fixed	Always 0	-

Notes:

- All four bytes of status are always transmitted.
- Recoverable errors include cover open, paper out, temperature or voltage is out of range.
- This command is processed as normal printer data.
- When the printer is disabled by the Select Peripheral Device command (ESC =), this command is disabled. If this command was previously enabled, status will still be returned.

TRANSMIT STATUS

Transmits the status specified by *n*. This is a batch mode command which transmits the response after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.

ASCII	GS r *n*
Hexadecimal	**1D 72 *n***
Decimal	29 114 *n*

Value of *n*	1, 49	=	printer status
	2, 50	=	Reserved
	4, 52	=	Flash memory User Sector status

The status bytes to be transmitted are described in the following two tables.

Printer Status (*n* = 1 or *n* = 49)

Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	Off	00	0	Paper present.
	On	01	1	Paper exhausted.
1	Off	00	0	Cover closed.
	On	02	2	Cover open.
2	Off	00	0	Paper present.
	On	04	4	Paper exhausted.
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Flash memory User Sector Status (*n* = 4 or *n* = 52)

Bit	Off/On	Hex	Decimal	Status for Transmit Status
0 & 1	Off	00	0	CDKO Open.
	On	03	3	CDKO Close.
2	Off	00	0	Not Used. Fixed to off
3	Off	00	0	Flash Logo area adequate, definition stored
	On	08	8	Flash logo area not adequate
4	Off	00	0	Not used. Fixed to off.
5	Off	00	00	No user-defined characters written to Flash
	On	20	32	User-defined characters written to Flash
6	Off	00	0	Not used. Fixed to off.
7	-	-	-	Undefined.

Exceptions
When *n* is out of the specified range, the command is ignored.

STORE SELECTED SENSOR THRESHOLD IN FLASH

This command will set the threshold value of the selected sensor. If the sensor A/D reading is below this threshold, the sensor status returned in the "US v" command will be zero. If the sensor A/D reading is at or above this threshold, the sensor status returned in the "US v" command will be one.

"GS s" OPERAND DEFINITION		
m		**Sensor**
Decimal	**Hex**	**Sensor**
0	00	Paper Out

ASCII GS s m n
Hexadecimal **1D 73 m n**
Decimal 29 115 m n

Operand: *m* = sensor select
n = threshold value

Limit: Decimal: m = 0
$0 \le n \le 255$
Hex: M = 00
$00 \le n \le FF$

Default: Decimal: *n* = 128
Hex: *n* = 80

Note: This command will be ignored if the current printer configuration is set to use the selected sensor for printer operation.

RETURN SRAM SIZE

Returns the size of SRAM on board

ASCII	GS BS
Hexadecimal	**1D 08**
Decimal	29 08

The size in Kbytes is returned as a zero terminated ASCII string.

RETURN CPU FREQUENCY

Returns the CPU frequency in MHz

ASCII	GS HT
Hexadecimal	**1D 09**
Decimal	29 09

The frequency is returned as a zero terminated ASCII string.

VOLTAGE AND TEMPERATURE MONITORING

Returns the results of latest voltage and temperature measurements.

ASCII	US LF n
Hexadecimal	**1F 0A n**
Decimal	31 10 n

Limit: Decimal: $132 \leq n \leq 133$
Hex: $84 \leq n \leq 85$

Always returns 7 Bytes :
Command ID + zero terminated ASCII string.

RETURNED STATUS DEFINITION ***n* = 0x84: Read Voltage (in Volt)**		
Byte	Function	Value
0	Command Id	0x84
1-5	ASCII string	
6	End of String	0x00

RETURNED STATUS DEFINITION ***n* = 0x85: Read Print head Temperature (in °C)**		
Byte	Function	Value
0	Command Id	0x85
1-5	ASCII string	
6	End of String	0x00

SEND PRINTER SOFTWARE VERSION

The printer returns 8 bytes containing the boot and flash software version.
The first 4 bytes returned are an ASCII string for the boot version.
The second 4 bytes are an ASCII string for the flash version.

Example: the printer returns 1.071.15
This means the boot version is 1.07 and the flash version is 1.15

ASCII	US V
Hexadecimal	**1F 56**
Decimal	31 86

6.13 Real Time Commands

The Real Time commands provide an application interface to the printer even when the printer is not handling other commands.

- Real Time Request to Printer: GS (Hex 1D) Sequence and DLE (Hex 10) Sequence
- Real Time Status Transmission: GS (Hex 1D) Sequence and DLE (Hex 10) Sequence
- Real Time Printer Status Transmission

The original Printer Status commands, Transmit Printer Status (Hex 1B 76, ASCII ESC v) are placed in the printer's data buffer as they are received and handled by the firmware in the order in which they were received.
If the paper exhausts while printing data that was in the buffer ahead of the status command, the printer goes busy at the communication interface and suspends processing the data in the buffer until paper is reloaded.
This is true for all error conditions: knife home error, thermal print head overheating, etc. In addition, there is no way to restart the printer after a paper jam or other error.

The Real Time commands are provided to overcome these restrictions.

RULES FOR USING REAL TIME COMMANDS

Three situations must be understood when using real time commands:

1) The printer executes the Real Time command upon receiving it and will transmit status regardless of the condition of the host being ready to receive or not.

2) The printer transmits status whenever it recognizes a Real Time Status Transmission command sequence, even if that sequence happens to occur naturally within the data of another command, such as graphics data.
In this case the sequence will be processed both ways: as a real time command and as the graphics data it is intended to be when the graphics command is executed from the buffer. The result is that the host might receive status messages it has not requested.

3) If the printer is in error condition, meaning that the communication interface is likely to be busy, the host must be able to send the real time commands regardless of this busy state at the interface. Otherwise those commands wouldn't be received and processed.

These three situations generally preclude use of standard DOS drivers for the serial communication ports when using real time commands.

MOVING DATA THROUGH THE BUFFER

Applications should not let the buffer fill up with Real Time commands when the printer is busy at the communication interface. A busy condition can be determined by bit 3 of the response to GS ENQ or GS EOT 1 or DLE EOT 1. Other responses to GS EOT n or DLE EOT n can determine the reason for a particular busy condition.

Although the printer responds to Real Time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received.
When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the Real Time commands will eventually get flushed out.

When the printer is busy due to an error condition, then data stops being processed of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with Real Time commands.

When the DLE sequences are being used, the last byte stored when the buffer fills up could be the DLE code, with no room for the subsequent EOT or ENQ. When this lone DLE byte is finally processed out of the buffer it will be interpreted as a Clear Printer command.

Similarly, when the GS sequences are being used, the last byte stored when the buffer fills up could be the GS code, with no room for the subsequent EOT or ETX or ENQ. When this lone GS byte is finally processed out of the buffer it will use the next byte, whatever it is, as the second byte in its GS sequence.

To guard against this situation, the application must determine the cause of a busy condition and take appropriate action or pace the Real Time commands to avoid filling the buffer. There is a minimum of 256 bytes available in the printer's buffer when it goes busy.

BUSY LINE AND FAULT CONDITIONS

If the printer is in error condition (cover is open, paper is exhausted…), the printer will still accept data, respond to the batch mode status commands (ESC v and ESC u) and not go busy until it actually tries to execute a print command. Then it will stay busy and stop processing data out of the receive buffer until the condition clears. It will respond to the Real Time commands as described below.

REAL TIME RECOVERY FROM FAULT

This command will select the recovery mode when the printer detects a fault condition. Any fault condition that prevents the printer from any printing function requires one of these commands to allow printing to resume.

	DLE Sequence	
ASCII	DLE ENQ *n*	
Hexadecimal	**10 05 *n***	
Decimal	16 5 *n*	
Operand	*n* = recovery mode	
Limit	Decimal:	$1 \le n \le 2$
	Hex:	$01 \le n \le 02$

"DLE ENQ" OPERAND DEFINITION

n		
Decimal	Hex	Fault recovery mode
1	01	Restarts printing from the beginning of the line where a fault occurred, after recovering from the fault. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this operand.
2	02	Recovers from a fault after clearing the receive and print buffers. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this operand.

Notes:

- This command is equivalent to the 'GS ETX' command.
- This command will attempt recovery from any fault that prevents printing including jams and paper out.
- Recovering from a print head over temperature condition is only accomplished by waiting until the print head has returned to its operating temperature range.
- This command will be ignored until manual intervention has occurred to clear the fault condition. The indication of manual intervention for clearing paper out, paper jams and cutter fault consists of opening and closing the clamshell.

This command will select the recovery mode when the printer detects a fault condition. Any fault condition that prevents the printer from any printing function requires one of these commands to allow printing to resume. See the equivalent 'DLE ENQ' command for the operand definition.

	GS Sequence
ASCII	GS ETX *n*
Hexadecimal	**1D 03 *n***
Decimal	29 3 *n*

Operand: *n* = recovery mode

Limit: Decimal: $1 \le n \le 2$

Hex: $01 \le n \le 02$

Notes:

- This command will attempt recovery from any fault that prevents printing including jams and paper out
- Recovering from a print head over temperature condition is only accomplished by waiting until the print head has returned to its operating temperature range.
- This command will be ignored until manual intervention has occurred to clear the fault condition. The indication of manual intervention for clearing paper out, paper jams and cutter fault consists of opening and closing the clamshell.

REAL TIME STATUS TRANSMISSION

Transmits the selected one byte printer status specified by *n* in Real Time according to the following parameters. This command includes two sequences: GS and DLE.

	GS Sequence	DLE Sequence
ASCII	GS EOT *n*	DLE EOT *n*
Hexadecimal	**1D 04 *n***	**10 04 *n***
Decimal	29 4 *n*	16 4 *n*

	GS Sequence	DLE Sequence
Value of *n*	1 = Transmit printer status	1 = Transmit printer status
	2 = Transmit communication interface busy status	2 = Transmit communication interface busy status
	3 = Transmit error status	3 = Transmit error status
	4 = Transmit receipt paper status	4 = Transmit receipt paper status

Exceptions
The command is ignored if *n* is out of range.

Related Information

1 = Transmit Printer Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	CDKO Open.
	On	04	4	CDKO Close.
3	Off	00	0	Not busy at the communication interface.
	On	08	8	Printer is Busy at the communication interface.
4	On	10	16	Fixed to On.
5				Undefined.
6				Undefined.
7	Off	00	0	Fixed to Off.

2 = Transmit communication interface Busy Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	Cover closed.
	On	04	4	Cover open.
3	Off	00	0	Paper feed button is not pressed.
	On	08	8	Paper feed button is pressed.
4	On	10	16	Fixed to On.
5	Off	00	0	Printing not stopped due to paper condition.
	On	20	32	Printing stopped due to paper condition.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	Off	00	0	Fixed to Off.

3 = Transmit Error Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	Fixed to Off.
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	On	10	16	Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	Thermal print head temp. and power supply voltage are in range.
	On	40	64	Thermal print head temp. or power supply voltage are out of range.
7	Off	00	0	Fixed to Off

4 = Transmit Receipt Paper Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Undefined
3	Off	00	0	Undefined
4	On	10	16	Fixed to On
5	Off	00	0	Paper present
	On	20	32	Paper exhausted
6	Off	00	0	Paper present
	On	40	64	Paper exhausted
7	Off	00	0	Fixed to Off

REAL TIME PRINTER STATUS TRANSMISSION

Transmits one byte status of the printer in real time.

ASCII	GS ENQ
Hexadecimal	**1D 05**
Decimal	29 5

Value of Byte

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Undefined
1	Off	00	0	Undefined
2	Off	00	0	Cover closed.
	On	04	4	Cover open.
3	Off	00	0	Not busy at the communication interface.
	On	08	8	Printer is busy at the communication interface.
4	Off	00	0	CDKO Open.
	On	10	16	CDKO Close.
5	Off	00	0	Fixed to Off.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	On	80	128	Fixed to On.

6.14 Bar Code Commands

These commands format and print bar codes are described in order of their hexadecimal codes.

SELECT PRINTING POSITION OF HRI CHARACTERS

Prints HRI (Human Readable Interface) characters above or below the bar code.

ASCII GS H *n*
Hexadecimal **1D 48 *n***
Decimal 29 72 *n*

Value of n Printing position
0 = Not printed
1 = Above the bar code
2 = Below the bar code
3 = Both above and below the bar code

Default 0 (Not printed)

SELECT PITCH OF HRI CHARACTERS

Select font used to print HRI characters.

ASCII GS f *n*
Hexadecimal **1D 66 *n***
Decimal 29 102 *n*

Value of *n* 0 = Standard Pitch at 15 CPI
1 = Compressed Pitch at 20 CPI

Default 0 (Standard Pitch at 15 CPI)

SELECT BAR CODE HEIGHT

Sets the bar code height to *n* dots or *n*/203 inch (*n*/8 mm).

ASCII GS h *n*
Hexadecimal **1D 68 *n***
Decimal 29 104 *n*

Value of *n* Number of dots
Range of *n* 1-255
Default 216

Selects the bar code type and prints a bar code for the ASCII characters entered. If the width of the bar code exceeds one line, the bar code is not printed.

There are two variations to this command. The first variation uses a NULL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the Code 128 bar code that can accept a NULL character as part of the data. With the second variation the length of byte is specified at the beginning of the string.

Bar codes can be aligned left, center, or right using the Align Positions command (1B 61).

The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer. Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules. Start/Stop characters are added for Code 39 if they are not included.

Rotated barcodes set with small modules (select bar code width command 1D 77 n , n=2 and PDF417 barcodes in any orientation are printed at low speed, for better readability.

	First Variation	**Second Variation**
ASCII	GS k *m d1…dk* NUL	GS k *m n d1…dn*
Hexadecimal	**1D 6B *m d1…dk* NUL**	**1D 6B *m n d1…dn***
Decimal	29 107 *m d1 dk* NUL	29 107 *m n d1…dn*

(0 = End of command)

Exceptions
The command is only valid at the beginning of a line.
Illegal data cancels the command.

Values

First Variation: Data string terminated with NULL Character

M	**Bar Code**	**D**	**n, Length**
0	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
1	UPC-E	48- 57	Fixed Length: 11, 12
2	JAN13 (EAN)	48- 57	Fixed Length: 12, 13
3	JAN8 (EAN)	48- 57	Fixed Length: 7,8
4	Code 39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) *d1* = *dk* = 42 (start/stop code is supplied by printer if necessary)	Variable Length
5	Interleaved 2 of 5	48- 57	Variable Length (Even Number)
6	Codabar	65- 68, start code,48- 57, 36, 43, 45, 46, 47, 58	Variable Length
10	PDF 417	32-255	Variable Length

Second Variation Length of Byte Specified at Beginning of String

The value of *m* selects the bar code system as described in the table.

The variable *d* indicates the character code to be encoded into the specified bar code system. See the table. If character code *d* cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

m	Bar Code	D	n, Length
65	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
66	UPC-E	48- 57	Fixed Length: 11, 12
67	JAN13 (EAN)	48- 57	Fixed Length: 12, 13
68	JAN8 (EAN)	48- 57	Fixed Length: 7, 8
69	CODE39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) *d1* = *dk* = 42 (start/stop code is supplied by printer if necessary)	Variable
70	Interleaved 2 of 5 (ITF)	48- 57	Variable (Even Number)
71	CODABAR (NW-7)	65- 68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable
72	Code 93	0-127	Variable
73	Code 128	0-105 *d1* = 103-105 (must be a Start code) *d2* = 0-102 (data bytes) (Stop code is provided by the printer)	Variable
75	PDF 417	0-255	Variable Length

SELECT BAR CODE WIDTH

Sets the bar code module to *n*/203 inch (*n*/8 mm).

ASCII	GS w *n*
Hexadecimal	**1D 77 *n***
Decimal	29 119 *n*

Value of *n*	2, 3, 4, 5,6
Default	n=3
Formulas	*n*/203 inch (*n*/8 mm)

6.15 Page Mode Commands

Page mode is one of two modes that the APOS PREMIUM controller uses to operate.

Standard mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received.

Page mode is different in that it processes or prepares the data as a “page” in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define.

The page is printed using either the FF (0C) or the ESC FF (1B 0C) command.

The Select Page Mode command (1B 4C) puts the printer into page mode.

Any commands that are received are interpreted as page mode commands. Several commands react differently when in standard mode and page mode.

The descriptions of these individual commands in this chapter indicate the differences in how they operate in the two modes.

PRINT AND RETURN TO STANDARD MODE

When printing is completed, values for Select Print Direction in Page Mode (ESC T) and Set Print Area in Page Mode (ESC W) and the position for buffering character data are set. Buffered data is not deleted from the printer.
The processed data is printed and the printer returns to standard mode. The developed data is deleted after being printed. For more information, see Page Mode in this document.

ASCII	FF
Hexadecimal	**0C**
Decimal	12

Exceptions
This command is enabled only in page mode.

CANCEL PRINT DATA IN PAGE MODE

Deletes all the data to be printed in the “page” area. Any data from the previously selected “page” area that is also part of the current data to be printed is deleted.

ASCII	CAN
Hexadecimal	**18**
Decimal	24

Exceptions
This command is only used in page mode.

PRINT DATA IN PAGE MODE

Collectively prints all buffered data in the printing area.

After printing, the printer does not clear the buffered data and sets values for Select Print Direction in Page Mode (ESC T) and Set Print Area in Page Mode (ESC W), and sets the position for buffering character data.

ASCII	ESC FF
Hexadecimal	**1B 0C**
Decimal	27 12

Exceptions

This command is enabled only in page mode.

SELECT PAGE MODE

Switches from standard mode to page mode. After the Print and Return to Standard Mode (FF) command or Select Standard Mode (ESC S) have completed printing, the printer returns to standard mode. The developed data is deleted after being printed.

This command sets the position where data is buffered to the position specified by Select Print Direction in Page Mode (ESC T) within the printing area defined by Set Print Area in Page Mode (ESC W).

This command switches the settings for the following commands (which values can be set independently in standard mode and page mode) to those for page mode.

Set Right-Side Character Spacing (ESC SP)
Select 1/6-Inch Line Spacing (ESC 2)
Set Line Spacing (ESC 3)

It is possible only to set values for the following commands in page mode. These commands are not executed.

Select or Cancel 90 Degree Clockwise Rotation (ESC V)
Set Counter Clockwise Rotation (ESC DC2)
Select Justification (ESC a)
Select or Cancel Upside-Down Printing (1B 7B).
Set Left Margin (GS L)
Set Print Area Width (GS W)

ASCII	ESC L
Hexadecimal	**1B 4C**
Decimal	27 76

Exceptions

The command is enabled only when input at the beginning of a line

The command has no effect if page mode has previously been selected.

SELECT STANDARD MODE

Switches from page mode to standard mode. In switching from page mode to standard mode, data buffered in page mode are cleared, the printing area set by Set Print Area in Page Mode (ESC W) is initialized and the print position is set to the beginning of the line.

This command switches the settings for the following commands (the values for these commands can be set independently in standard mode and page mode) to those for standard mode:

Set Right-Side Character Spacing (ESC SP)
Select 1/6 Inch Line Spacing (ESC 2)
Set Line Spacing (ESC 3)

Standard mode is automatically selected when power is turned on, the printer is reset, or the Initialize Printer command (ESC @) is used.

ASCII	ESC S
Hexadecimal	**1B 53**
Decimal	27 83

Exceptions

This command is effective only in page mode.

SELECT PRINT DIRECTION IN PAGE MODE

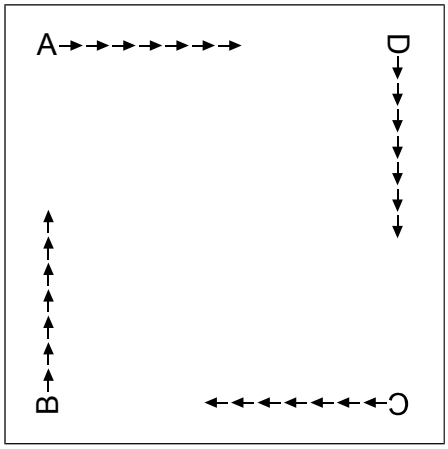
Selects the printing direction and start position in page mode. See the illustration.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the Print Page Mode commands (FF or ESC FF).

ASCII	ESC T *n*
Hexadecimal	**1B 54 *n***
Decimal	27 84 *n*

Value of *n* Start position

0 = Upper left corner proceeding across page to the right (A)
1 = Lower left corner proceeding up the page (B)
2 = Lower right corner proceeding across page to the left (upside down) (C)
3 = Upper right corner proceeding down page (D)



Default 0

Exceptions

The command is valid only in page mode.
The command is ignored if the value of *n* is out of the specified range.

SET PRINT AREA IN PAGE MODE

Sets the position and size of the printing area in page mode.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the Print Page Mode commands (FF or ESC FF).

ASCII	ESC W n1, n2 ...n8
Hexadecimal	**1B 57 n1, n2 ...n8**
Decimal	27 87 n1,n2 ...n8

Range of *n*	0-255	
Default	*n1-4* =	0
	n5 =	64
	n6 =	2
	n7 =	64
	n8 =	2

Formulas

The starting position of the print area is the upper left of the area to be printed (x0, y0). The length of the area to be printed in the y direction is set to dy inches. The length of the area to be printed in the x direction is set to dx inches. Use the equations to determine the Value of x0, y0, dx, and dy.

See the illustration for a graphic representation of the printing area. For more information about the fundamental calculation pitch, see the Set Horizontal and Vertical Motion Units command (1D 50).

x0 = [(*n*1 + *n*2 x 256) x (horizontal direction of the fundamental calculation pitch)]
y0 = [(*n*3 + *n*4 x 256) x (vertical direction of the fundamental calculation pitch)]
dx = [(*n*5 + *n*6 x 256) x (horizontal direction of the fundamental calculation pitch)]
dy = [(*n*7 + *n*8 x 256) x (vertical direction of the fundamental calculation pitch)]

Keep the following notes in mind for this command:

- The fundamental calculation pitch depends on the vertical or horizontal direction.
- The maximum printable area in the x direction is 576/203 inches for 80-mm paper.
- The maximum printable area in the y direction is 576/203 inches for 80-mm paper.

SET ABSOLUTE VERTICAL PRINT POSITION IN PAGE MODE

Sets the absolute vertical print starting position for buffer character data in page mode.
The absolute print position is set to [(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] inches.
The vertical or horizontal motion unit for the paper roll is used and the horizontal starting buffer position does not move.

The reference starting position is set by the Select Print Direction in Page Mode (ESC T), and operates setting the absolute position in the vertical direction, when the starting position is set to the upper left or lower right; and sets the absolute position in the horizontal, when the starting position is set to the upper rights or lower left.
The horizontal and vertical motion units are specified by the Set Horizontal and Vertical Minimum Motion Units (GS P) command.

The Set Horizontal and Vertical Minimum Motion Units (GS P) command can be used to change the horizontal and vertical motion unit.
However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

ASCII	GS $ *nL nH*
Hexadecimal	**1D 24 *nL nH***
Decimal	29 36 *nL nH*

Formulas [(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] inches.

Exceptions

This command is effective only in page mode.
If the [(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

SET RELATIVE VERTICAL PRINT POSITION IN PAGE MODE

Sets the relative vertical print starting position from the current position.
This command can also change the horizontal and vertical motion unit.
The unit of horizontal and vertical motion is specified by this command.

This command functions as follows, depending on the print starting position set by Select Print Direction in Page Mode (ESC T):

1. When the starting position is set to the upper left or lower right of the printing area, the vertical motion unit (*y*) is used.
2. When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit (*x)* is used.

ASCII	GS \ *nL nH*
Hexadecimal	**1D 5C *nL nH***
Decimal	29 92 *nL nH*

Value

The value for the horizontal and vertical movement cannot be less than the minimum horizontal movement amount, and, must be in even units of the minimum horizontal movement amount.

Formulas

The distance from the current position is set to [(*nL* + *nH* x 256) x vertical or horizontal motion unit] inches.

For downward movement, pitch n is specified as:	n = *nL* + *nH* x 256
For upward movement, *(nL* + *nH* x 256) is negative and pitch *n* is specified as:	*n = 65536 – (nL* + *nH* x 256)

Exceptions

This command is used only in page mode, otherwise it is ignored.
Any setting that exceeds the specified printing area is ignored.

6.16 Macro Commands

These commands are used to select and perform a user-defined sequence of printer operations.

SELECT OR CANCEL MACRO DEFINITION

Starts or ends macro definition. Macro definition begins when this command is received during normal operation and ends when this command is received during macro definition.
The macro definition is cleared, during definition of the macro when the Execute Macro (GS ^) command is received.

Normal printing occurs while the macro is defined. When the power is turned on the macro is not defined. The defined contents of the macro are not cleared by the Initialize Printer (ESC @), thus, the Initialize Printer (ESC @) command may be used as part of the macro definition.

If the printer receives a second Select or Cancel Macro Definition (GS :) command immediately after previously receiving a Select or Cancel Macro Definition (GS :) the printer remains in the macro undefined state.

ASCII	GS :
Hexadecimal	**1D 3A**
Decimal	29 58

Formulas
The contents of the macro can be defined up to 2048 bytes.

Exceptions : If the macro definition exceeds 2048 bytes, excess data is not stored.

EXECUTE MACRO

Executes a macro. After waiting for a specified period the printer waits for the Paper Feed Button to be pressed. After the button is pressed, the printer executes the macro once.
The printer repeats this operation the number of specified times.

When the macro is executed by pressing the Paper Feed Button (*m* = 1), paper cannot be fed by using the Paper Feed Button.

ASCII	GS ^ *r t m*
Hexadecimal	**1D 5E *r t m***
Decimal	29 94 *r t m*

Value of *r*	The number of times to execute the macro.
Value of *t*	The waiting time for executing the macro.

Formulas
The waiting time is *t* x 100 ms for every macro execution.
m specifies macro executing mode when the LSB (Least significant bit) *m* = 0
The macro executes *r* times continuously at the interval specified by *t* when the LSB (Least significant bit) of *m* = 1.

Exceptions :
If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared. If the macro is not defined or if *r* is 0, nothing is executed.

6.17 Drawer kick-out & internal buzzer Commands

GENERATE SOLENOID PULSE

Generates a pulse on pin "m" of the drawer kick-out connector in accordance with the table below.

ASCII	ESC p m n1 n2
Hexadecimal	**1B 70 m n1 n2**
Decimal	27 112 m n1 n2

Formulas

n1 x 2 ms is the On time of the pulse.
n2 x 2 ms is the Off time of the pulse.
0<= n1 <= n2 <= 255

m	Connector	Pin
0	1	2
1	1	5

ACTIVATE INTERNAL PRINTER BUZZER

This command generates one pulse on internal buzzer.

ASCII	ESC Bel
Hexadecimal	**1B 07**
Decimal	25 07

6.18 Flash Firmware Download Commands

These commands are used to load firmware into the printer.

There are two ways to enter the download mode.

1. While the printer is running normally, send the command, “Switch to Flash Download Mode (1B 5B 7D)” to leave normal operation and enter the download mode.
2. If the Flash if found corrupted during Level 0 diagnostics the download mode is automatically entered after the printer has reset.

The printer never goes directly from the download mode to normal printer operation.

To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel download mode and reboot.

When each flash download command is received, the printer returns either ACK or NAK to the host computer when each command is received:

ACK (hexadecimal 06)
Sent when the printer has received a host transmission and has completed the request successfully.

NAK (hexadecimal 15)
Sent when a request is unsuccessful.

The commands are listed in numerical order according to their hexadecimal codes. Each command is described and the hexadecimal, decimal, and ASCII codes are listed.

Communicates to the printer information downloaded from applications. Data is downloaded to flash memory to query the state of the firmware, calculate the firmware CRC and other functions.

Firmware Download Sequence

By providing a set of low-level commands, great freedom of implementation is given to customer application to customize the sequence to match its specific requirements.

Following is the description of a typical Firmware download sequence.
Only the main steps are mentioned. Error checking and error recovery is not described.

1) Switch to Flash Download Mode

2) Check Flash Memory Size

3) Erase all Flash Memory sectors, except Boot Sector

4) Download Code to Active Flash Sector
    4.1) Select Flash memory sector #n (each sector contains 64kbytes)
        4.1.1) Program segment of N bytes
        4.1.2) if more segments, loop back to 4.1.1)
    4.2) if more sectors to program, loop back to 4.1)

5) Check Flash CRC

6) Reboot Printer

SWITCH TO FLASH DOWNLOAD MODE

Puts the printer in flash download mode in preparation to receive commands controlling the downloading of objects into flash memory.
When this command is received, the printer leaves normal operation and can no longer print transactions until the Reboot the Printer command (1D FF) is received or the printer is rebooted.

This command does not affect the current communication parameters. Once the printer is in flash download mode, this command is no longer available.

ASCII	ESC [}
Hexadecimal	**1B 5B 7D**
Decimal	27 91 125

Related Information

See Entering Flash Download Mode elsewhere in this book to put the printer in flash download mode using the Configuration Menu.

RETURN FLASH MEMORY SIZE

Returns the size of the flash used. There are 16 sectors (64K each) in flash memory. This command assures that the firmware to be downloaded is the appropriate size for flash memory.

ASCII	GS SOH
Hexadecimal	**1D 01**
Decimal	29 1

The returned value corresponds to the highest sector number that can be accepted by the Select Sector to Download (1D 02 *nn*) command.:

Value and Range of *n* 15 = 1 Mbytes Flash

Exceptions

Available only in download mode.

SELECT FLASH MEMORY SECTOR TO DOWNLOAD

Selects the flash sector (nn) for which the next download operation applies.
The values of the possible sector are restricted, depending upon the flash part type.
The printer transmits an ACK if the sector number is acceptable or an NAK if the sector number is not acceptable. Sector numbers start at 0

ASCII	GS STX *nn*
Hexadecimal	**1D 02 *nn***
Decimal	29 2 *nn*

Value and Range of *n* 0-15 = 1M bytes Flash

Exceptions : Available only in download mode.

GET FLASH FIRMWARE CRC STATUS

Causes the printer to calculate the CRC for the Flash firmware code space and transmits the result.

This is performed normally after downloading completely a new firmware to verify that the downloaded firmware is valid

The printer transmits ACK if the calculated CRC is correct; NAK if the CRC is incorrect

ASCII	GS ACK
Hexadecimal	**1D 06**
Decimal	29 6

RETURN BOOT SECTOR CRC

Returns the CRC calculated over the boot sector code space.

ASCII	GS BEL
Hexadecimal	**1D 07**
Decimal	29 7

Formulas

ACK <low byte> <high byte>

ERASE ALL FLASH CONTENTS EXCEPT BOOT SECTOR

Causes the entire flash memory to be erased.
The printer returns ACK if the command is successful; NAK if it is unsuccessful.

ASCII	GS SO
Hexadecimal	**1D 0E**
Decimal	29 14

Exceptions:
Available only in download mode.

RETURN MAIN PROGRAM FLASH CRC

Returns the CRC calculated over the flash firmware code space. The format of the response is ACK <low byte> <high byte>.

ASCII	GS SI
Hexadecimal	**1D 0F**
Decimal	29 15

ERASE SELECTED FLASH SECTOR

Erases the previously selected sector. The printer transmits ACK when the sector has been erased. If the previous sector is not successfully erased, or if no sector was selected, the printer transmits NAK.

ASCII	GS DLE *n*
Hexadecimal	**1D 10 *n***
Decimal	29 16 *n*

Value and Range of *n* 0-15 = 1M bytes Flash

Exceptions
Available only in download mode.

DOWNLOAD TO ACTIVE FLASH SECTOR

Contains a start address (ah x 256 + al) and count (ch x 256 + cl) of binary bytes to load into the selected sector, followed by that many bytes.
The start address is relative to the start of the sector. Addresses run from 0 to 64K.

The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block. NAK means that, for some reason, the data was not written correctly. This could mean that communications failed or that the write to flash failed.
The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

ASCII	GS DC1 al ah cl ch d1…dn
Hexadecimal	**1D 11 al ah cl ch d1…dn**
Decimal	29 17 al ah cl ch d1…dn

Value of *al*	=	low byte of the address (it is sent before the high byte) must be even
Value of *ah*	=	high byte of the address (it is sent after the low byte)
Value of *cl*	=	low byte of the count (it is sent before the high byte) must be even
Value of *ch*	=	high byte of the count (it is sent after the low byte)
Value of *d*	=	data bytes, from 2 to n

Value of *n* (for number of data bytes)	**Range of Address (*a*l *a*h)**	**Range of Count (*c*l *c*h)**
((ch * 256) + cl)	0000-FFFE (hexadecimal)	0002-FFFE (hexadecimal)

Range Addresses run from 0 to 64K.

Related Information
Available only in download mode.

6.19 Boot Download

SET NEW BOOT CODE PARAMETERS

Set the size for next boot code to be downloaded.

ASCII	**US** ACK *n*
Hexadecimal	**1F 06 *n***
Decimal	31 06 *n*

Value and Range of *n* 0-2
0 = 16 Kbytes
1 = 32 Kbytes
2 = 24 Kbytes

Default 2 (24 Kbytes)

Exceptions
Available only in download mode.

ERASE BOOT SECTOR + DOWNLOAD NEW BOOT CODE

Wait for new boot code to be downloaded, then if CRC on this new boot code is valid, boot code sector is erased and reprogrammed with new code.
Printer automatically reboot after program sequence is complete.

ASCII	**US** SOH d1 .. dn
Hexadecimal	**1F 01 d1 .. dn**
Decimal	31 01 d1 .. dn

Value and Range of *n* Size of boot code set with command 1F 06 n

Exceptions
Available only in download mode.

***Note*:**
During erase and download sequence, power supply must be maintained at all times and no reset sequence should be performed

6.20 User Flash Memory Commands

SELECT MEMORY TYPE (SRAM/FLASH) WHERE TO SAVE LOGOS OR USER-DEFINED FONTS

Specifies whether to load the logos or user-defined characters to flash memory or to RAM (volatile memory). The selection remains in effect until it is changed via this command or until the power cycles.

ASCII	GS " *n*
Hexadecimal	**1D 22 *n***
Decimal	29 34 *n*

Value of *n* 48-51

n = 48 (ASCII *n* = 0)
Loads active logo to RAM only. This is used to print a special logo but not have it take up flash memory. A logo defined following this command is not preserved over a power cycle.

n = 49 (ASCII *n* = 1)
Loads active logo to flash memory. This is the default condition for logo flash storage. A logo defined following this command is stored in flash memory.

n = 50 (ASCII *n* = 2)
Loads user-defined characters to RAM only. This is the default condition for user-defined character storage. Any user-defined characters defined following this command are not preserved over a power cycle.

n = 51 (ASCII *n* = 3)
Loads user-defined characters to flash memory. An application must use this command to store user-defined characters in flash memory. Any user-defined characters defined following this command are stored in flash memory. A user-defined character cannot be redefined in flash memory. The flash memory page must be erased by an application before redefining user-defined characters. For more information, see the Erase User Flash Sector (1D 40 *n*) Command earlier in this section.

FLASH MEMORY USER SECTORS ALLOCATION

This command sets the allocation of flash sectors between user data storage and logos/user defined characters. This allocation is saved in the EEPROM of the printer and is therefore saved across power cycles.

ASCII	GS " U n1 n2
Hexadecimal	**1D 22 55 *n1 n2***
Decimal	29 34 85 n1 n2

Default value of *n1*	1	(see below)
Default value of *n2*	1	(see below)

n1 is the number of 64K sectors used for logos and user defined characters.
n2 is the number of 64K sectors used for user data storage.
n1 + n2 ≤ 11 (1M flash memory)
If (n1 + n2) is greater than the maximum number of sectors available, the command is ignored.
Issuing this command with parameters different from current parameters will erase all sectors.

RETURN USER FLASH MEMORY ALLOCATION STATUS

Returns the amount of Flash memory available in user section.

ASCII	US w *n*
Hexadecimal	**1F 77 *n***
Decimal	31 119 *n*

Value of *n* 49

Returns the number of bytes available as a zero terminated ASCII string.

ERASE USER FLASH SECTOR

Erases a section of user flash memory and sends a carriage return when the operation is complete.

ASCII	GS @ *n*
Hexadecimal	**1D 40 *n***
Decimal	29 64 *n*

Value of *n* 49-51

n = 49 (ASCII *n* = 1)
This command erases all 64K Flash memory sectors allocated to user-defined characters and logos storage. Those sectors should be erased in two situations: when the logo definition areas is full and an application is attempting to define new logos, and when an application wants to replace one user-defined character set with another. In both cases, all logos and character set definitions are erased and must be redefined.

n = 50 (ASCII *n* = 2)
This command erases all 64K Flash memory sectors allocated to user data storage.

n = 51 (ASCII *n* = 3)
This command erases all 64K Flash memory sectors allocated to EasyFont storage.

Related Information
See command “Flash Memory User Sectors Allocation “1D 22 55 n1 n2”.

Important While erasing flash memory, all communication is disabled. To provide feedback to the application, the printer responds to the application when the erase is complete. After sending the Erase User Flash Sector (1D 40 *n*) command, an application should wait for the response from the printer before sending data. Otherwise, data will be lost. If an application is unable to receive data, it should wait a minimum of five seconds after sending the Erase User Flash Sector (1D 40 *n*) command before sending data.

6.21 *User Data Storage Commands*

WRITE TO USER DATA STORAGE

Writes *m* bytes of data to the user data storage flash-page at the address specified. The printer waits for *m* bytes of data following the 3-bytes address, *addr*.

ASCII	ESC ‘ m a2 a1 a0 d1…dm
Hexadecimal	**1B 27 m a2 a1 a0** d1…dm
Decimal	27 39 m a2 a1 a0 d1…dm
Value of *m*	0 – 255
Addr	(65536 x a2) + (256 x a1) + a0

If any of the memory locations addressed by this command are not currently erased, the command is not executed.

READ FROM USER DATA STORAGE

Reads *m* bytes of data to the user data storage flash-page at the address specified.

ASCII	ESC 4 m a2 a1 a0
Hexadecimal	**1B 34 m a2 a1 a0**
Decimal	27 52 m a2 a1 a0
Value of *m*	0 – 255
Addr	(65536 x a2) + (256 x a1) + a0

6.22 *Peripheral control commands*

ENABLE OR DISABLE PANEL BUTTON

Enables or disables the paper feed button by toggling the paper feed button on and off. Only the lowest bit is used to toggle the paper feed button. If the last bit is 0, the paper feed button is enabled. If the last bit is 1, the paper feed button is disabled.

ASCII	ESC c 5 *n*
Hexadecimal	**1B 63 35 *n***
Decimal	27 99 53 *n*
Value of *n*	0 = Enable
	1 = Disable
Default	0 (Enable)

Exceptions
Functions that require the panel button cannot be used when it has been disabled with this command.

6.23 Transaction Monitoring Commands

The following commands are provided as tools to monitor actual transaction completion, by providing synchronization mechanisms with cut commands.

PROCESS TICKET COUNTER

The ticket counter is a 16-bit counter in memory that gets incremented or cleared by sending a corresponding command to the printer.

ASCII	US a n
Hexadecimal	**1F 61 n**
Decimal	31 97 n

Value of *n*	01	Clear Ticket Counter
	02	Increment Ticket Counter

Note that this command may be used to monitor actual transaction completion, as it is synchronized with cut commands.

This means that if this command is sent immediately after a cut command, it won't be processed until the cut cycle is complete.

REQUEST TICKET COUNTER

Returns the contents of 16-bit Ticket Counter.

ASCII	US b
Hexadecimal	**1F 62**
Decimal	31 98

Returns 3 bytes: Command ID followed by the contents of Ticket Counter

Byte 1	=	62h
Byte 2	=	Ticket Counter (LSB)
Byte 3	=	Ticket Counter (MSB)

Range:	Decimal:	0	≤ *Ticket Counter* ≤ 65535
	Hex:	0000	≤ *Ticket Counter* ≤ FFFF

SET CUT TAG

The cut tag is a flag stored in memory, used to monitor the ticket transactions completion.

Send this command prior to a cut command, and then monitor the result with command Request Cut Tag (1F 64)

Sets the cut tag to the value specified by *n*

ASCII	US c n
Hexadecimal	**1F 63 n**
Decimal	31 99 n

Value of *n* Cut tag value

Range of *n* 0-255

REQUEST CUT TAG

Returns Cut Tag status.

ASCII	US d
Hexadecimal	**1F 64**
Decimal	31 100

Returns 2 bytes: Command ID followed by Cut Tag Status

Byte 1 = 64h
Byte 2 = Cut Tag Status

Once the Cut tag is set with command Set Cut Tag (1F 63 n), the Cut Tag Status returned depends on the next cut cycle:

CUT TAG STATUS	
situation	**Returned value**
cut cycle is not complete	0
cut cycle is complete	Value set with command 1F 63 n

6.24 Easy Font Support

The downloadable fonts are stored in Flash memory in a dedicated area, separate from the code and usual logos and user fonts storage areas.
The area size is multiple of 64kbytes.

Fonts may be downloaded at any given time, but cannot be deleted individually.

Single Byte Fonts

Single byte fonts (code pages) are downloaded differently from double byte fonts. Single byte fonts may be downloaded with the new 1C 4C command.

Up to four single byte fonts can be downloaded to the printer at any given time, with each font identified as a code page. 224 characters, with an address range of 20h to FFh, are downloaded for each code page. One of the operands of the 1C 4C command designates the operand for the 1B 74 *n* command that will select that code page.

If a font is downloaded with the same name as an existing font, the current one is invalidated and replaced by the new one. Note that the old one is not erased, but just not accessible anymore, so it still takes up some space in memory.

To restore this amount of memory, all fonts have to be erased.

Double Byte Fonts

One double byte font (typically Asian) may be downloaded at any given time with the new 1C 44 and 1C 45 commands.

If a double byte font is to be downloaded into a printer with an existing double byte font, the existing font first needs to be deleted with 1D 40 33 command before the new font can be downloaded.

One of the operands of the 1C 44 command designates the operand for the
1B 74 *n* command that will select that code page. This operand is fixed and must be equal to 34h.

Font Names

A font name is downloaded with each font, which is printed on the diagnostic or configuration form, allows a user to determine which fonts are downloaded in a particular printer.

Printer Response

When a font is downloaded to the printer, the printer will respond with an ‘ACK’ (06h) or ‘NAK’ (15h) character once the download is complete. The host must wait for the ‘ACK’ or ‘NAK’ to be returned before transmitting any additional information to the printer. If the download is successful, an ‘ACK’ is automatically returned. If the download is unsuccessful, a ‘NAK’ will be returned.

A font download is unsuccessful when:

- Insufficient printer memory exists for the downloaded data
- Attempting to download a double byte font in a printer with an existing double byte font without first deleting the existing font

DOWNLOAD SINGLE BYTE FONT

Download a single byte font code page to the printer. If the download is successful, an ACK will be returned. If unsuccessful, a NAK will be returned.
A font must always be downloaded completely, which corresponds to 224 characters.
The font name is used to identify the font. It will be printed on the diagnostics or configuration form. When a downloaded font is to be deleted, the font name is used to identify the font. Two fonts cannot have the same name.
Each character is downloaded as rasters, from top to bottom, and for each raster, from leftmost byte to righmost byte.
The storage Id provides the operand for the 'ESC t *n*' (1Bh 74h *n*) command that will be used to select this code page. Two fonts cannot have the same storage Id.

Syntax	**ASCII:**	FS	L	f_8	*t*	*w*	*h*	{*d*}
	Hex:	**1C**	**4C**	$\boldsymbol{f_8}$	***t***	***w***	***h***	**{*d*}**

Operand	*f*:	8 character font name	
	t:	font storage Id	
	w:	font character width in dots, including inter-character space	
	h:	font character height in dots, not including inter-line space	
	d:	downloaded data bytes	
Limit	Hex:	$0x20 \le f \le 0x7F$	
		$0x30 \le t \le 0x33$	
		$0x01 \le w \le 0x30$	
		$0x01 \le h \le 0x40$	
		$0x00 \le d \le 0xFF$	
Returns	ASCII:	OK:	ACK
		Fault:	NAK
	Hex:	OK:	0x06
		Fault:	0x15

DOWNLOAD DOUBLE BYTE FONT

Download a single band of a double byte font characters to the printer. If the download is successful, an ACK will be returned. If unsuccessful, a NAK will be returned.
If multiple font character bands are to be downloaded, the font name, code page selection, width, and height must be the same for all download commands. The start address of each command should be greater than the start address of the preceding download command.

The font name is used to identify the font. It will be printed on the diagnostics or configuration form. When a downloaded font is to be deleted, the font name is used to identify the font.

Only one double byte font can be downloaded into the printer at any given time. An existing double byte font needs to be deleted prior to downloading a new double byte font.

Syntax	**ASCII:**	FS	D	f_8	t	w	h	s_L	s_H	n_L	n_H	$\{d\}$
	Hex:	**1C**	**44**	$\boldsymbol{f_8}$	$\boldsymbol{t}$	$\boldsymbol{w}$	$\boldsymbol{h}$	$\boldsymbol{s_L}$	$\boldsymbol{s_H}$	$\boldsymbol{n_L}$	$\boldsymbol{n_H}$	$\boldsymbol{\{d\}}$

Operand	*f*:	8 character font name
	t:	font storage Id
	w:	font character width in dots, including inter-character space
	h:	font character height in dots, not including inter-line space
	sL, sH:	band Start address = 256 x sH + sL
	nL, nH:	number of characters in the band = 256 x nH + nL
	d:	downloaded data bytes
Limit	Hex:	$0x20 \le f \le 0x7F$
		$t = 0x34$
		$0x11 \le w, h \le 0x20$
		$0x2000 \le s \le 0xFFFF$
		$0x0001 \le n \le 0xFFFF$, limited to available memory
		$0x00 \le d \le 0xFF$
Returns	ASCII:	OK: ACK
		Fault: NAK
	Hex:	OK: 0x06
		Fault: 0x15

DOWNLOAD DOUBLE BYTE FONT COMPLETE

Tells the printers that all bands for selected font are downloaded. If the download is successful, an ACK will be returned. If unsuccessful, a NAK will be returned.

Syntax	**ASCII:**	FS	E	f_8
	Hex:	**1C**	**45**	$\boldsymbol{f_8}$

Operand	*f*:	8 character font name	
Limit	Hex:	0x20 ≤ *f* ≤ 0x7F	
Returns	ASCII:	OK:	ACK
		Fault:	NAK
	Hex:	OK:	0x06
		Fault:	0x15

READ FONT INFORMATION AND CHECKSUM

If selected font exists, this command returns ACK followed by font information.
Else it returns NAK.

Syntax	**ASCII:**	FS	F	*t*
	Hex:	**1C**	**46**	***t***

Operand	*t*:	Font storage Id	
Limit	Hex:	0x30 ≤ t ≤ 0x34	
Returns	ASCII:	OK:	ACK followed by font name = 8 bytes ASCII string font width = 1 byte font height = 1 byte number of characters = 2 bytes (little endian) 16 bit checksum = 2 bytes (little endian)
		Fault:	NAK

DELETE FONTS

To delete the Easyfont storage area, use command “Erase User Flash Sector “ 1D 40 n

DOWNLOAD AND PRINT ONE CHARACTER

Temporary download to printer SRAM and print character in normal, rotated and double high/ double wide modes. If download and print successful, an ACK will be returned. If unsuccessful, a NAK will be returned.

Syntax	**ASCII:**	FS	G	*w*	*h*	{*d*}
	Hex:	**1C**	**47**	***w***	***h***	**{*d*}**

Operand	*w*:	font character width in dots, including inter-character space
	h:	font character height in dots, not including inter-line space
	d:	downloaded data bytes
Limit	Hex:	0x01 ≤ *w* ≤ 0x30
		0x01 ≤ h ≤ 0x40
		0x00 ≤ *d* ≤ 0xFF
Returns	ASCII:	OK: ACK
		Fault: NAK
	Hex:	OK: 0x06
		Fault: 0x15

CHECK EASYFONT COMPATIBILITY

The printer returns whether it supports or not Easyfont. If it does, it also returns the list of available font Ids (single byte, double byte) that can be used to download a font.

Syntax	**ASCII:**	FS	H
	Hex:	**1C**	**48**

Returns	ASCII:	OK: ACK + list of available font Ids + 00
		Fault: NAK
	Hex:	OK: 06 + list of available font Ids + 00
		Fault: 15

6.25 Configuration commands

SET MAX POWER CONSUMPTION

Synopsis: Set Maximum Power parameter

Syntax:	ASCII:	US	ETX	EOT	*n*
	Decimal:	31	3	4	*n*
	Hex:	**1F**	**03**	**04**	***n***

Operand: *n* = mode selection
Limit: See table below

Description: This command will store the maximum power setting in non-volatile memory.

Note:

SELECT MAXIMUM POWER CONSUMPTION OPERAND DEFINITION		
N		
Decimal	**Hex**	**Mode**
60	3C	60 Watt
75	4B	75 Watt
90	5A	90 Watt

MAX SPEED

Synopsis:	Setting Printer max speed							
Syntax:	ASCII:	US	FF	S	P	F	*nL*	*nH*
	Decimal:	31	12	83	80	70	*nL*	*nH*
	Hex:	**1F**	**0C**	**53**	**50**	**46**	***nL***	***nH***

Description: Sets the maximum printer peak speed.
This maximum speed is typically reached at low dot coverage.
Actual print speed decreases when dot coverage increases.

Max Speed = 256 x nH + nL

SET PRINT DENSITY

Synopsis:	Setting Print density						
Syntax:	ASCII:	US	VT	N	R	J	*n*
	Decimal:	31	11	83	80	69	*n*
	Hex:	**1F**	**0B**	**4E**	**52**	**4A**	***n***

Limit:	Decimal:	$70 \leq n \leq 120$
	Hex:	$46 \leq n \leq 78$

Description: Set the print density (energy applied to paper) in percent relative to nominal energy.

WARNINGS!!

Choose a print density setting no higher than necessary to achieve acceptable print density
Failure to observe this rule may result in a printer service call
Failure to observe this rule may void the printer warranty
Consult your Axiohm technical support specialist if you have questions

SET PREHEATING OPTION

Synopsis:	Set Print head pre-heating mode				
Syntax:	ASCII:	US	ETX	VT	*n*
	Decimal:	31	3	11	*n*
	Hex:	**1F**	**03**	**0B**	***n***

Operand:	*n* = mode selection	
Limit:	Decimal:	$0 \leq n \leq 1$
	Hex:	$00 \leq n \leq 01$

Description: This command will store the print head pre-heating option in non-volatile memory.

Note: When this mode is enabled, the controller monitors the print head temperature and keeps it above 35°C

PRE-HEATING OPTION OPERAND DEFINITION		
N		
Decimal	**Hex**	**Mode**
0	00	Disabled
1	01	Enabled

SET KNIFE OPTION

Synopsis:	Set Knife Option				
Syntax:	ASCII:	US	ETX	STX	*n*
	Decimal:	31	3	2	*n*
	Hex:	**1F**	**03**	**02**	***n***
Operand:	*n* = mode selection				
Limit:	Decimal:	0 ≤ n ≤ 1			
	Hex:	00 ≤ n ≤ 01			

Description: This command will store the knife option in non-volatile memory.

Note:

KNIFE OPTION OPERAND DEFINITION		
Decimal	**Hex**	**Mode**
0	00	Disabled
1	01	Enabled

SET PARTIAL CUT DISTANCE

Synopsis:	Set Partial Cut distance parameter				
Syntax:	ASCII:	US	ETX	LF	*n*
	Decimal:	31	3	10	*n*
	Hex:	**1F**	**03**	**0A**	***n***
Operand:	*n* = width selection				
Limit:	Decimal:	0 ≤ n ≤ 4			
	Hex:	00 ≤ n ≤ 04			

Description: This command will store the partial cut distance parameter in non-volatile memory.

Note: This setting must be set to match the mechanism connected to the board, in order to get partial cut position matching the knife notch.

This setting is used to compensate for mechanical tolerances on parts involved in knife operation.

PARTIAL CUT DISTANCE OPERAND DEFINITION		
Decimal	**Hex**	**Mode**
0	00	125 knife motor steps
1	01	130 knife motor steps
2	02	135 knife motor steps
3	03	140 knife motor steps
4	04	145 knife motor steps

SET QUEUE TICKET MODE

Synopsis:	Queue Ticket Mode				
Syntax:	ASCII:	US	ETX	LF	*n*
	Decimal:	31	3	160	*n*
	Hex:	**1F**	**03**	**A0**	***n***

Operand:	*n* = mode selection	
Limit:	Decimal:	0 ≤ n ≤ 2
	Hex:	00 ≤ n ≤ 02

Description: This command will store the Set Queue Ticket Mode in non-volatile memory.

Note:

QUEUE TICKET MODE OPERAND DEFINITION		
N		
Decimal	**Hex**	**Mode**
0	00	Disabled
1	01	Header First
2	02	Footer First

SET DEFAULT FONT

Synopsis:	Set Default Font				
Syntax:	ASCII:	US	ETX	SI	*n*
	Decimal:	31	3	15	*n*
	Hex:	**1F**	**03**	**0F**	***n***

Operand:	*n* = mode selection	
Limit:	Decimal:	0 ≤ n ≤ 1
	Hex:	00 ≤ n ≤ 01

Description: This command will store the default font option in non-volatile memory.

Note:

DEFAULT FONT OPERAND DEFINITION		
N		
Decimal	**Hex**	**Mode**
0	00	Resident Font
1	01	User Defined Font

SET COMMUNICATION INTERFACE PARAMETERS

Synopsis:	Setting communication parameters								
Syntax:	ASCII:	US	STX	n1	n2	n3	n4	n5	n6
	Decimal:	31	2	n1	n2	n3	n4	n5	n6
	Hex:	**1F**	**02**	**n1**	**n2**	**n3**	**n4**	**n5**	**n6**

Description:

n1	Interface
00h	RS232
03h	USB

n2, bit [0..2]	RS232 Baudrate
00h	1200
01h	2400
02h	4800
03h	9600
04h	19200
05h	38400
06h	57600
07h	115200

n2, bit 4	RS232 Number of stop bits
0	1
1	2

n2, bit 5	RS232 Number of data bits
0	8
1	7

n3	RS232 Parity
0x00	Odd parity
0x01	Even parity

n4	RS232 Parity mode
0x00	No parity
0x01	Enabled and set using parameter described above

n5	RS232 Handshaking
0x00	Xon/Xoff
0x01	DTR/DSR

n6	RS232 Parity Error Processing
0x00	Ignore
0x01	Print '?'

Notes:

1) This command is processed only in boot mode (see section 3.6.2).
If the printer is running in normal mode, send first command “switch to Boot Mode” (1B 5B 7D).
2) This command must be followed by “Printer Reset” command (1D FF).

SET DIAGNOSTICS MODE

Synopsis:	Set diagnostics mode				
Syntax:	ASCII:	US	ETX	NUL	*n*
	Decimal:	31	3	0	*n*
	Hex:	**1F**	**03**	**00**	***n***

Operand:	*n* = mode selection	
Limit:	Decimal:	0 ≤ n ≤ 2
	Hex:	00 ≤ n ≤ 02

Description: This command will store the printer diagnostics mode in non-volatile memory.

Note: This mode is used to select a test mode

DIAGNOSTICS MODE OPERAND DEFINITION		
N		
Decimal	**Hex**	**MODE**
0	00	Normal operation
1	01	Data scope mode
2	02	Receipt print test

SET DEFAULT CODE PAGE

Synopsis:	Set default code page				
Syntax:	ASCII:	US	ETX	Ç	*n*
	Decimal:	31	3	128	*n*
	Hex:	**1F**	**03**	**80**	***n***

Operand: *n* = code page selection
Limit: See table below

Description: This command will store the default code page in non-volatile memory.

Note: The default code page selects which code page will be initially used by the printer until it is changed using the "ESC R" or "ESC t" commands.

CODE PAGE OPERAND DEFINITION		
n		
Decimal	**Hex**	**Code Page**
0	00	437 : US
1	01	850 : Multilingual
2	02	852 : Slavic
3	03	860 : Portuguese
4	04	863 : Canadian – French
5	05	865 : Nordic
6	06	858
7	07	866
8	08	1252
9	09	862
10	0A	Katakana

RESET EEPROM

Synopsis:	Reset EEPROM						
Syntax:	ASCII:	US	CR	C	L	E	*n*
	Decimal:	31	13	67	76	69	*n*
	Hex:	**1F**	**0D**	**43**	**4C**	**45**	***n***

Operand: *n* = security byte
Limit: *n* = 0

Description: This command will reset the non-volatile memory configuration items to their default values.

Notes: This command must be sent while the printer is in its normal operating mode.
Once the configuration parameters are downloaded to the printer using this command, the printer must be reset before they take effect.

This command is processed in boot mode only if the printer is running in normal mode, send first command “Switch to Download Mode” 1B 5B 7D.

RESET EEPROM OPERAND DEFINITION		
n		
Decimal	**Hex**	**Reset**
0	00	Reset EEPROM

7 TROUBLESHOOTING

Axiohm printers are simple and generally trouble-free, but from time to time minor problems may occur. Follow these procedures to determine the cause and resolution of any problems the printer may be having. If the procedures in this section do not correct the problem, contact a service representative.

7.1 Light indicator

When light is on continuously, the printer is ready to operate.
When light is flashing, an error occurs.

7.2 Problems & Solutions

7.2.1 Printer Problems

Problem	What to Do
Printer does not function when turned on.	Check that printer cables are properly connected on both ends. Check that the host or power supply is getting power.
	Receipt cover may not be fully closed. Close and latch the receipt cover.
Light is off	Check the power-supply and cables connections.
Light is continuously on but printer does not operate	Check to see if the interface cable is well connected.
Light is flashing	Check that cover is well closed, if not close it. Open the cover and make sure there is paper left in the printer, if not: remove the paper roll core, place a new paper roll as indicated in the chapter "Loading paper". Open the cover and check there is no paper jam, if there is some: unwind the paper until no wrinkle appears, close the cover with wrinkled part out and cut it with the tear bar.

7.2.2 LED Problems

Problem	Possible Causes	What to Do
LED, slow continuous flashing	Paper out.	Put in a new paper roll.
	Cover off.	Put the cover on.
	Knife unable to home.	Contact your authorized service representative.
	Print head too hot	
	Voltages out of range	

7.2.3 Printing Problems

Problem	Possible Causes	What to Do
Printing quality is deteriorating	Print head may be getting dirty.	See next chapter ”Cleaning your printer”.
Colored stripe on the receipt.	Paper is low.	Change the paper.
Receipt does not come out all the way.	Paper is jammed.	Open the receipt cover, inspect the knife, and clear any jammed paper.
Printer starts to print, but stops while the receipt is being printed.	Paper is jammed.	Open the receipt cover, inspect the knife, and clear any jammed paper.
Receipt is not cut.	Paper is jammed.	Open the receipt cover, inspect the knife, and clear any jammed paper.
	The printer is not configured for a knife.	Contact your authorized service representative.
Print is light or spotty.	Paper roll loaded incorrectly.	Check that the paper is loaded properly.
	Thermal print head is dirty.	Use recommended thermal receipt paper.
	Variations in paper.	Increase print density in “Set Hardware Options” of printer Configuration Menu as needed.
Vertical column of print is missing.	This indicates a serious problem with the printer electronics.	Contact your authorized service representative.
One side of receipt is missing.	This indicates a serious problem with the printer electronics.	Contact your authorized service representative.

8 CLEANING YOUR PRINTER

Depending on the environment in which the printer is used, it can accumulate dust. Therefore it is necessary to clean it periodically to maintain a good print quality. The cleaning period depends on the environment and the usage of the printer, but the print head should be cleaned at least once a year or up to one month in heavy duty applications.

Cleaning Instructions:

- Unplug the printer. **Never clean the head immediately after printing, the head may be hot.**
- Open the cover, clean the heating dots line of the head with a cotton stick containing a solvent alcohol (ethanol, methanol, or IPA) but **do not touch the print head with your fingers**!
- Allow the solvent to dry and close the cover.
- N.B **AXIOHM can provide cleaning kits Ref : CK80000A**

9 SPARES

All spare parts kits are supplied as individually packaged loose parts. It is possible to obtain different groups of spare parts kits. AXIHOM customer service will provide the list later.

Reference	Designation	Contents
A3107615	**POWER SUPPLY CABLE APOS EU (12 items/kit)**	Lot of:
For Products:	APOSxx-xx-xxx	European cables (x12)
A3107616	**POWER SUPPLY CABLE APOS US (12 items/kit)**	Lot of:
For Products:	APOSxx-xx-xxx	US cables (x12)
A3107617	**POWER SUPPLY CABLE APOS GB (12 items/kit)**	Lot of:
For Products:	APOSxx-xx-xxx	Great Britain cables (x12)
A3107618	**POWER SUPPLY CABLE APOS AUS (12 items/kit)**	Lot of:
For Products:	APOSxx-xx-xxx	Australian cables (x12)
K3107630	**COVER KIT APOS PREMIUM**	Lot of:
For Products:	APOS 2100-xxx	Light grey equiped cover (x1)
K3108076	**COVER KIT APOS PREMIUM**	Lot of:
For Products:	APOS 2101-xxx	Black equiped cover (x1)
K3107631	**PLATEN ROLLER KIT APOS PREMIUM**	Lot of:
For Products:	APOSxx-xx-xxx	Equiped platen roller (x1)
K3107632	**PROGRAMMED CONTROLLER BOARD KIT APOS PREMIUM**	Lot of:
For Products:	APOS 21xx-xxx	Equiped controller board (x1)
K3107633	**PRINT HEAD KIT APOS PREMIUM**	Lot of:
For Products:	APOSxx-xx-xxx	Print head (x1)
K3107634	**MECHANICAL PARTS KIT APOS PREMIUM**	Lot of:
For Products:	APOSxx-xx-xxx	Mechanical kit (x1)

K3107635	**TOP & BOTTOM CASTING KIT APOS PREMIUM**	Lot of:
For Products:	APOS 2100-xxx (light grey)	Top casting (x1) Bottom casting (x1)
K3108077	**TOP & BOTTOM CASTING KIT APOS PREMIUM**	Lot of:
For Products:	APOS 2101-xxx (black)	Top casting (x1) Bottom casting (x1)

CK60000A	**CLEANING KIT 60MM AXIOHM (10 items/kit)**	Lot of:
For Products:	APOSxx-xx-xxx	Cleaning kits 60mm (x10)

* Screws, washers, rivets and any other small hardware not mentioned in the contents list are supplied with the kits when needed.